

## **B. Sc. General Microbiology under CBCS**

### **CC-1/GE1: INTRODUCTION AND SCOPE OF MICROBIOLOGY**

- CO1: Students gain in depth understanding and concepts of history of microbiology and about the various steps of discovery through which microbiology evolved.
- CO2: To gain fundamental concepts of the five kingdom classification and life cycle of some important prokaryotes
- CO3: To gain in-depth understanding on the working principles of different types of Microscopes.
- CO4: To gain conceptual knowledge of various methods of control of microorganisms and safety measures for handling them.
- CO5: To gain fundamental knowledge about the various microbes existing and interacting with different human systems and their different environmental interactions.
- CO6: To gain basic understanding of fermentation process and involved microbes
- CO7: To gain knowledge about microbes involved in food and dairy microbiology.

### **CC-2/GE2: BACTERIOLOGY AND VIROLOGY**

- CO1: To understand the structure of bacterial cells, its organelles, physiology and Behavior.
- CO2: To gain a detailed knowledge various physical and chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.
- CO3: Students gain in-depth understanding of various growth requirement and growth media to cultivate bacteria.
- CO4: Students gain detailed knowledge on the systemic classification of bacteria and characteristics of important bacterial groups
- CO5: To gain basic understanding on the various viral groups and basic characteristics
- CO6: Students gain fundamental information on various viral life cycles, diseases and their therapeutic outcomes.

### **CC-3/GE3: MICROBIAL METABOLISM**

- CO1: To gain basic understanding of different types of bacterial growth and methods to maintain them.
- CO2: Students gain concept on solutes, pH, oxygen and other factors affecting bacterial growth and study the different nutritional categories of bacteria.
- CO3: Students gain conceptual knowledge of aerobic and anaerobic respiration and various intermediary mechanisms involved, oxidative phosphorylation etc.
- CO4: To gain an overview of nitrogen metabolism carried out by microbes in soil.

### **CC-4/GE4: MICROBIAL GENETICS AND MOLECULAR BIOLOGY**

- CO1: Students gain knowledge on the basic structure, organization and salient features of nucleic acids across the prokaryotic and eukaryotic groups.
- CO2: Students gain an understanding of how DNA replication and recombination occurs in bacteria.
- CO3: The students will be able to understand the concept of gene expression, gene regulation, mutations and DNA repair in prokaryotes
- CO4: The students will be able to analyze the role of various enzymes, vectors and other tools used in genetic engineering
- CO5: The students will be able to apply the knowledge of recombinant DNA technology to create novel products

### **DSE-A-1: GENETIC ENGINEERING AND BIOTECHNOLOGY**

- CO1: To gain a conceptual knowledge of the milestones and achievements in the field of genetic engineering.
- CO2: To learn in detail the various techniques of gene transfer and enzymes involved in it.
- CO3: Students gain in depth information on different vectors used in the area of gene manipulation.
- CO4: The students will be able to discuss various methods gene amplification & DNA sequencing.

CO5: To gain in detail information on the different on various areas of application of genetic engineering.

CO6: To give a brief account on the basics of Intellectual Property Rights in the field.

### **DSE-B-1: MEDICAL MICROBIOLOGY AND IMMUNOLOGY**

CO1: Students gain a detailed account on the normal microflora of human body and its interaction with pathogens.

CO2: Students gain knowledge on the Collection, transport and culturing of clinical samples and their identification characteristics.

CO3: To gain a detailed account of diseases of various organ systems and their causative bacterial agents.

CO4: To gain a detailed account of diseases of various organ systems and their causative viral agents.

CO5: To gain a detailed account of diseases of various organ systems and their causative protozoal agents.

CO6: To gain a detailed account of diseases of various organ systems and their causative fungal agents.

CO7: Assess treatment strategies including the appropriate use of antimicrobial agents and common mechanisms of antimicrobial action and resistance.

CO8: To gain knowledge on the overall organization of the immune system and gain key concepts in immunology.

CO9: Students will gain a detailed understanding on the various Immunological Disorders and Tumor Immunity.

CO10: Students learn the various immunological skills and techniques used.

### **SEC-A-2: Microbial Quality Control in Food and Pharmaceutical Industries**

CO1: To gain detailed concept on the various good laboratory practices, biosafety levels and sterilization methods.

CO2: To learn various methods for their isolation, detection and identification of microorganisms in food and dairy.

- CO3: To learn the techniques of discovering useful microorganisms by various isolation, screening methods using different culture media.
- CO4: To gain an in depth knowledge on the Hazard analysis of critical control point (HACCP) for Food Safety and Microbial Standards.

**SEC-B-2: Hazard analysis of critical control point**

- CO1: Students gain understanding on the Definition, types, advantages and health benefits of various fermented food.
- CO2: Students gain in depth knowledge on the preparation of inoculums, types of microorganisms and production process of milk based fermented foods.
- CO3: Students gain in depth knowledge on the Microorganisms involved and production process of grain based fermented food.
- CO4: Students learn a detailed account on the production of vegetable based fermented foods.
- CO5: Students gain detailed knowledge on the different types, microorganisms involved, Fermentation process of meat & fish based fermented food products.
- CO6: Students will gain knowledge on the microorganisms involved and health benefits associated to probiotics.