

COURSE OUTCOMES
B.SC MICROBIOLOGY (CBCS)

Semester – I

Code	Course title	Course Type	HPW	Credits
MIC102	General Microbiology	DSE -1A	4+2	5

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

- ✚ Learn the History & Scope of Microbiology & Applications of Microorganisms in different sectors of Human Life
 - ✚ Understand the basic structure of Prokaryotic & Eukaryotic Cell and Viruses
 - ✚ Have a thorough knowledge of microscopes and learn the techniques to observe microorganisms.
 - ✚ Understand concept of sterilization and learn different methods of sterilization
 - ✚ Identify the nutritional requirements of different physiological groups of bacteria and their metabolism
 - ✚ Learn the basic and specific media composition for cultivation of different microorganisms.
 - ✚ Develop knowledge on pure cultures and methods of isolation and preservation.
 - ✚ Understand the concept of microbial growth and get equipped with various methods of bacterial growth measurement
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Semester – II

Code	Course title	Course Type	HPW	Credits
MIC202	Microbial Diversity	DSC-1B	4+2	5

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

- ✚ Understand the concept of Biodiversity & its Conservation as well as describe the elements of Biodiversity
- ✚ Understand the various systems of classification of Living Organisms & Bacterial Classification
- ✚ Comprehend the basic characteristics of prokaryotic and eukaryotic Cell
- ✚ Understand the Ecology, physiology and Metabolic diversity of Archaeobacteria & special groups of Bacteria.
- ✚ Overview of the structural, physiological & metabolic characteristics of Eukaryotic Organisms
- ✚ Understand the Concept of various microbial interactions
- ✚ Conceptual knowledge of Microbial Diversity & Great Plate Count Anomaly
- ✚ Understand & learn the different techniques used to study Microbial Diversity.

Semester – III

Code	Course Title	Course Type	HPW	Credits
BS	Food & Environmental Microbiology	DSC-1C	4+2	5

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

- ✚ Understand the beneficial role of microorganisms in food processing and the microbiology of different types of fermented foods – pickles, sauerkraut, Kimchi, Idli, etc.
- ✚ Study the different types of microorganisms in milk and their activities - fermented dairy products (cheese, yogurt, Bulgarian milk) and their applications as probiotics and prebiotics
- ✚ Understand the significance and activities of microorganisms in different foods and role of intrinsic and extrinsic factors of microbial growth in foods leading to spoilage, and understand the principles underlying the preservation methods
- ✚ 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
- ✚ Understand the role of microorganisms in water, air and safety standards to protect the environment
- ✚ Studies the soil environment and microbes harbouring and influencing soil ecosystem and their participation in biogeochemical cycle and learn in detail the types and mechanisms of nitrogen fixation.

Semester – III

Code	Course title	Course Type	HPW	Credits
BS	Hematology	SEC-1	2	2

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

- ✚ Explain the basic principles of medical terminology, infections and standard laboratory operating procedures.
- ✚ Understanding of the principles of blood and blood components
- ✚ Understand standard level of hemoglobin structure and abnormalities
- ✚ Interpretation of blood counts and management of common abnormalities
- ✚ Understand the role of anticoagulants and learn methods of storage, preservation, transfusions methodologies of blood and their importance.
- ✚ Distinguish normal and abnormal hematological laboratory findings to predict the diagnosis of hematological disorders and diseases.
- ✚ Perform basic hematological laboratory testing, assess laboratory data and report findings according to laboratory protocol.
- ✚ To provide in depth knowledge about the pathology and pathophysiology of haematological disorders.
- ✚ To help the students, read and evaluate laboratory values from routine blood examination and be able to differentiate between pathologies.
- ✚ To enhance the student's ability to produce a differential diagnosis based on clinical examination and laboratory values.
- ✚ To provide a basic understanding of the treatment protocols which are in place for haematology

Semester IV

Code	Course Title	Course Type	HPW	Credits
BS	Medical Microbiology & Immunology	DSC-1D	4+2	5

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

- ✚ Know the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body transmitted by air water and through contact.
- ✚ Provides opportunities to develop informatics and diagnostic skills, including the use and interpretation of laboratory tests in the diagnosis of infectious diseases and use of lab animals in medical field.
- ✚ To understand the importance of pathogenic bacteria in human disease with respect to infections of the food born, Insect born , Zoonotic mode and viral infections
- ✚ Demonstrate and understanding of key concepts in immunology along with overall organization of the immune system.
- ✚ Begin to appreciate the significance of maintaining a state of immune tolerance sufficient to prevent the emergence of autoimmunity.
- ✚ To make them understand the salient features of antigen antibody reaction & its uses in diagnostics and various other studies.

Semester IV

Code	Course title	Course Type	HPW	Credits
BS	Mushroom Cultivation	SEC-3	2	2

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

- ✚ To understand mushrooms, types (edible & poisonous) and mushroom production.
 - ✚ To know the prospects of commercial mushroom production at global level.
 - ✚ To understand the nutritional value and health benefits of mushrooms. ✚
- To make the learners self reliant to identify several kind of mushrooms.
- ✚ To understand methods of mushroom cultivation, packaging and marketing.
 - ✚ To develop a business plan on mushroom cultivation.
 - ✚ Learning cultivation of different edible mushrooms
 - ✚ Knowing harvesting and post harvesting processes of mushroom

Semester V

Code	Course title	Course Type	HPW	Credits
BS	Molecular biology and Microbial Genetics	DSE-1	3+2	5

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

- ✚ Analyze the basic concepts of hereditary and the process of inheritance; understand the functions and molecular structures of DNA and RNA and how they serve as genetic information and concept of plasmids and transposons.
- ✚ Analyze the molecular mechanisms behind DNA damage and repair, classify mutations and discuss the various ways in which bacteria acquire new genetic information. (transduction, transformation, and conjugation)
- ✚ Conceptualise gene and their types and explain the processes and regulatory mechanisms governing the synthesis of nucleic acid and protein
- ✚ Explain the basic principles of genetic engineering (enzymes and vectors) and the applications of genetic engineering in various fields.

Semester V

Code	Course title	Course Type	HPW	Credits
BS	Industrial Microbiology	DSE-2	4+2	5

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

- ✚ Appreciate how microbiology is applied in manufacture of industrial products, learn the techniques of discovering new microorganisms by various isolation, screening and strain improvement methods.
- ✚ Acquire knowledge of the design of Fermentors and process controls, different types of fermentation processes & understand the biochemistry of various fermentations and product recovery methods and factors affecting growth and production of products.
- ✚ Develop an understanding of fermentation & inoculum media, their formulation and principles & techniques of sterilization.
- ✚ Explain the various fermentation strategies and the growth kinetics of industrial microorganisms.
- ✚ Acquire Knowledge about microbial production of various industrial products such as alcohols, Vitamins, antibiotic,enzymes, organic acids, Antibiotics.

Semester - V

Code	Course title	Course Type	HPW	Credits
BS	Microbiology And Human Health	GE	4	4

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

- ✚ Understand nature of science and scientific enquiries, and have mastered a set of fundamental skills and effect of microorganisms on everyday life, health, food, sanitation, genetic engineering.
- ✚ Understand general characteristics of microorganisms
- ✚ Develop and have thorough knowledge on isolation techniques and staining methods for identification.
- ✚ Devise and prepare media for isolation and growth of microorganisms.
- ✚ Know the conceptual basis for understanding pathogenic microorganisms and the mechanisms by which they cause disease in the human body transmitted by air water and through contact.
- ✚ To understand the importance of pathogenic bacteria in human disease with respect to infections of the food born, Insect born , Zoonotic mode and bacterial and viral infections.
- ✚ Demonstrate and understanding of key concepts in immunology along with overall organization of the immune system.
- ✚ To know principles of medical terminology and about infections.
- ✚ To focus on waste management guidelines for safe disposal.