**BACHELOR OF SCIENCE ( MICROBIOLOGY)**

**SEMESTER – I**

 **CORE CODE I: PROFESSIONAL ENGLISH FOR LIFE SCIENCES (21UPEL01)**

**COURSE OUTCOMES (COs):**

After the successful completion of this course, the students will be able to

**CO1:** Recognise their own ability to improve their own competence in using the language.

**CO2:** Use language to speak with confidence in an intelligible and acceptable manner.

**CO3:** Understand the importance of reading for life.

**CO4:** Read independently unfamiliar texts with comprehension.

**CO5:** Understand the importance of writing in academic life.

**CO6:** Write simple sentences without committing errors of spelling or grammar.

**CORE COURSE-I: BASICS OF MICROBIOLOGY (21UMB01)**

**COURSE OUTCOMES:**

   After the successful completion of this course, the students will be able to:

**CO1:** Students will get an overall understanding of the fundamentals of microbiology.

**CO2:** To understand the concept of microscopy.

**CO3:** Gain knowledge about microbial evolution and diversity.

**CO4:** Acquire information on the anatomy of prokaryotes.

**ALLIED-1: BIOCHEMISTRY-I (21UBCA01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1**: Describe the process of carbohydrate digestion and absorption. Describe the function of carbohydratesin the body.

 **CO2**: Differentiating the twenty common amino acids found in living organisms Describe how a peptide bond forms.

**CO3**:  Explain that enzymes function by lowering the activation energy for biochemical reactions.

 **CO4**: Identify the chemicals the body uses to digest lipids.

 **CO5:** List and explain vitamins essential to the healthy functioning of the human body.

**CORE COURSE-I: BASICS OF MICROBIOLOGY (21UMBP01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis To quantify samples present in solutions by selecting appropriate methods

**ALLIED-1: BIOCHEMISTRY-I (21UBCAP01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis To quantify samples present in solutions by selecting appropriate methods

**SEMESTER – II**

**CORE CODE II: PROFESSIONAL ENGLISH FOR LIFE SCIENCES (21UPEL02)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** Attend interviews with boldness and confidence.

**CO2:** Adapt easily into the workplace context, having become communicatively competent.

**CO3:** Apply to the Research & Development organisations or sections of companies and offices with winning proposals.

**CO4:** Write simple sentences without committing errors of spelling or grammar.

**CORE COURSE-II: MICROBIAL PHYSIOLOGY (21UMB02)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** The students will get an overall understanding of the basic cell structure and classification of microorganisms based on their nutritional requirements.

**CO2:** Gain knowledge on the growth pattern of microorganisms and the influence of nutrients to obtain an active growth phase.

**CO3:** Information on energy-deriving mechanisms from different energy sources

**CO4:** Acquire information on the synthesis of organic molecules via the photosynthetic process.

**CORE COURSE-I: BASICS OF MICROBIOLOGY (21UMBP01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis To quantify samples present in solutions by selecting appropriate methods

**ALLIED-1: BIOCHEMISTRY-I (21UBCAP01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis to quantify samples, present in solutions by selecting appropriate methods

**SEMESTER – III**

**CORE COURSE-III: MICROBIAL GENETICS AND MOLECULAR BIOLOGY (21UMB03)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Understand the knowledge about genetic material and DNA replication.

**CO2:** Created an understanding about mutation and its types.

**CO3:** Procured the knowledge about transcription and translation.

**CO4:** Learned about gene transfer mechanisms in bacteria.

**CORE COURSE-III: MICROBIAL GENETICS AND MOLECULAR BIOLOGY (21UMBP03)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis to quantify samples, present in solutions by selecting appropriate methods

**SBEC I - APPLIED BIOTECHNIQUES (21UMBS01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** To acquire the basic science behind the research techniques.

**CO2:** Students will become familiar with biotechniques like chromatography, electrophoresis, and spectrophotometers for quantitative and qualitative analysis.

**CO3:** Students will be inculcated with precise and accurate interpretation skills in the research sector.

**CO4:** To imbibe the knowledge of modernised analytical methods to step into hi-tech industries.

**SEMESTER – IV**

**CORE COURSE-IV: IMMUNOLOGY AND IMMUNOTECHNOLOGY (21UMB04)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** The students will get an overall understanding of the history and evolution of immunology and the immune response developed by the human system.

**CO2:** To understand the concept of antigen, antibody interaction, and influence on the human immune system via hypersensitivity reactions, autoimmune diseases, etc.

**CO3:** Detailed understanding of immunology, transplantation immunology, and vaccines, which will make you aware of infection, prevention, and control.

**CO4:** Help the students learn techniques involved in immunological concepts and their role in diagnostic immunology.

**SBEC II: MUSHROOM CULTIVATION TECHNIQUES   (21UMBS02)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Able to get basic ideas about mushroom cultivation

**CO2:** Learned techniques about spawn multiplication.

**CO3:** Learned about the diseases of edible mushrooms.

**CO4:** Made the students ideally skilled for self-employment.

**CORE COURSE-IV: IMMUNOLOGY AND IMMUNOTECHNOLOGY (21UMBP04)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to

**CO1:** By attending the course, the students will be able

**CO2:** To prepare molar, normal, and percentage solutions

**CO3:** To identify unknown samples by systematic analysis to quantify samples, present in solutions by selecting appropriate methods

**SEMESTER – V**

**CORE COURSE-V: MEDICAL BACTERIOLOGY (21UMB05)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Understand the basic and general concepts of infection and the various parameters of causing infections. Assessment of their severity, including the broad categorization of the methods of diagnosis.

**CO2:** Developed a thorough understanding of common gram positive bacterial diseases in human beings.

**CO3:** Conceptualised the role of some bacteria as well as the mechanisms underlying their pathogenicity.

**CO4:** Developed a thorough understanding of some special pathogenic bacteria affecting the human organ system.

**CORE COURSE-VI: FOOD MICROBIOLOGY (21UMB06)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Know the positive and negative role of microbes in food.

**CO2:** Grain knowledge about fermented food products

**CO3:** Understand the significance of food-borne diseases.

**CO4:** Realise the importance of food sanitation and quality assurance.

**SEMESTER – V**

**CORE COURSE-VII: MEDICAL VIROLOGY (21UMB07)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Understand and Recognize characters of different types of viruses causing infections, the assessment of their severity, methods of diagnosis, and their prophylaxis.

**CO2:** Recognise how the two different classes, DND and RNA viruses, cause viral diseases in human beings.

**CO3:** Conceptualised the role of viruses as well as the mechanisms underlying their pathogenicity, detection, and prophylaxis.

**CO4:** Developed a thorough understanding of some special pathogenic viruses causing recent epidemics and threatening the whole world.

**ELECTIVE: MEDICAL PARASITOLOGY (21UMBE01)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Understanding the taxonomy of parasite and host-parasite interactions

**CO2:** In-depth knowledge on clinical diagnosis, pathogenicity, and the life cycle of protozoa's

**CO3:** Assimilate various lab technologies for the diagnosis of medically important protozoa and their treatment.

**CO4:** Articulate the major means of transmission of parasites by insect vectors and their control measures.

**SBEC -III: MICROBIAL BIOTECHNOLOGY (21UMBS03)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Understand the knowledge about the Basic Principles of Gene Cloning.

**CO2:** Acquire knowledge about molecular cloning tools.

**CO3:** Created an understanding of cloning vector gene transfer techniques.

**CO4:** Procure knowledge about methods of molecular cloning.

**SEMESTER – VI**

**CORE COURSE-VIII: SOIL AND AGRICULTURAL MICROBIOLOGY (21UMB08)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Able to understand the distribution of microbes in soil

**CO2:** Capable of getting information about the biogeochemical cycle.

**CO3:** Able to get knowledge about microbial interaction.

**CO4:** Capable of getting ideas about plant disease.

**CORE-IX: ENVIRONMENTAL MICROBIOLOGY (21UMB09)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Able to understand the microbial diversity in the environment

**CO2:** Capable of getting information about the ecosystem.

**CO3:** Able to get an overall understanding of the pollution.

**CO4:** Capable of understanding basic knowledge about bioremediation.

**CORE-X: INDUSTRIAL MICROBIOLOGY (21UMB10)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Able to select and design a fermentation process for a specific product.

**CO2:** Capable of industrially important microbes and its potential applications

**CO3:** Able to device means to improve the production rate of existing fermentation processes.

**CO4:** Capable of designing processes for higher production yield at an economically cheaper rate.

**ELECTIVE-II: MEDICAL MYCOLOGY (21UMBE02)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** Basic understanding of fungi, their morphology, and culture methods of fungi

**CO2:** Obtain knowledge on the pathogenicity and laboratory diagnosis of medically important fungi.

**CO3:** Gain knowledge on mycotoxins and their importance.

**CO4:** Gain knowledge on antifungal agents and their testing methods.

**SBEC-II: ENTREPRENEURIAL MICROBIOLOGY (21UMBS04)**

**COURSE OUTCOMES:**

After the successful completion of this course, the students will be able to:

**CO1:** To make knowledge about the role of microbes in industries

**CO2:** Gained knowledge about fermented products.

**CO3:** To understand the significance of patenting.

**CO4:** Able to make the students ideally skilled for self-employment