**BACHELOR OF SCIENCE BIOTECHNOLOGY**

**SEMESTER – I**

**CORE PAPER – 1: CELL BIOLOGY (21UBT01)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Students will be able to design cell structures.

**CO2:** Differentiate the structure of prokaryotic and eukaryotic cells.

**CO3:** Understanding the organisation of genes and chromosomes, chromosome morphology

**CO4:** Can compare and contrast the events of the cell cycle and its regulation.

**CO5:** Understanding the communication of cells with other cells and with the environment

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

**COURSE OUTCOMES (COs):**

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

**CO1: Describe the** structures, properties, and functions of carbohydrates.

**CO2:** Understand the structures, properties, and role of amino acids and proteins.

**CO3:** Describe the nomenclature and identify the classes of enzymes and factors affecting it.

**CO4:** Demonstrate the structure and properties of lipids and nucleic acids.

**CO5:** Describe the source, importance, and deficiency disorders of vitamins and minerals.

**SEMESTER – II**

**CORE PAPER -2: GENETICS ( 21UBT02 )**

**COURSE OUTCOMES (COs):**

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

**CO1: Obtain an** acquaintance with a historical overview of microbial genetics and genetic material.

**CO2:** Comprehend the concept of replication of genetic materials.

**CO3:** Understand the regulation of gene expression and mutation.

**CO4:** Demonstrate the genetic exchange mechanism in microorganisms.

**CO5:** Gain knowledge on mutation and grasp the basics of genetics and their objects.

**ALLIED -2: BIOCHEMISTRY (21UBCA02)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Understand the basics of the acid-base balance of the human body and gain competence in handling various chromatographic techniques.

**CO2:** Describe carbohydrate metabolism and gain knowledge about diabetes mellitus.

**CO3:** Learn basic concepts of bioenergetics and mechanisms of oxidative phosphorylation.

**CO4:** Describe the concepts of lipid metabolism and amino acid metabolism.

**CO5:** Gain knowledge about the basic terminologies, classifications, and mechanisms of action of hormones and demonstrate various types of second messengers.

**SBEC- 1 BIOPHYSICS AND INSTRUMENTATION (21UBTS01)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Demonstrate the basics of instruments.

**CO2:** Exemplify the structure of atoms and molecules by using the principles of spectroscopy.

**CO3:** Evaluate by separating and purifying the components.

**CO4:** Understand the need and application of imaging techniques.

**CO5:** Categorize the working principle and application of fluorescence and radiation-based techniques.

**SEMESTER-III**

**CORE PAPER -3: GENERAL MICROBIOLOGY (21UBT03)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Understand the scope of microbiology and the spontaneous biogenesis of microbiology.

**CO2:** Understand and differentiate the different types of microbes.

**CO3:** Analyse media composition and grow the desired microbe.

**CO4:** Apply the knowledge to enumerate the microorganisms in the environment.

**CO5:** Evaluate the success of understanding life viruses.

**SBEC -2: DEVELOPMENT BIOLOGY (21UBTS02)**

**COURSE OUTCOMES (COs):**

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

**CO1: Use the** main development biology concepts.

**CO2:** The molecular mechanisms that underlie animal plant development

**CO3:** Explain the underlying developmental biology processes of sperm and eggs.

**CO4:** Review scientific literature in the subject of development biology.

**CO5:** Understands the students about sequential changes from a single cell.

**ALLIED – 3: BIOSTATISTICS (21UTSA07)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Understand and apply statistical methods like measures of location.

**CO2:** Develop the ability to apply the methods while working on research.

**CO3:** Understand large and small samples in laboratory studies to apply it to real-life project work.

**CO4:** Understand correlation and regression.

**CO5:** Choose the appropriate research design and develop appropriate projects.

**SEMESTER – IV**

**CORE PAPER – 4: MOLECULAR BIOLOGY (21UBT04)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Learning structural levels of nucleic acids (DNA and RNA) and genome organisation in prokaryotic and eukaryotic organisms

**CO2:** Understanding the concept of genes and the gene architecture

**CO3:** Overview of the central dogma of life, various molecular events, DNA replication, and the role of different enzymes

**CO4:** Molecular events in translation leading to protein synthesis and post-translation

**CO5:** Understand the regulation of gene expression in prokaryotic cells using the operand concept.

**ALLIED- 4: E.COMMERCE (21UCSA07)**

**COURSE OUTCOMES (COs):**

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

**CO1:** The student is imparted with knowledge on both hardware and software.

**CO2:** Improve analytical and critical thinking skills through problem solving.

**CO3:** Apply computer technology in the field of life science-allied research.

**CO4:** Students have a better standing in the use of computers for various applications.

**CO5:** This is a skill-based paper that introduces the students to the basics of computer operations.

**SEMESTER –V**

**CORE PAPER -5: PLANT BIOTECHNOLOGY (21UBT05)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Understand scientific and technical skills in plant study.

**CO2:** Acquire knowledge on limitations and challenges in plant cell tissue culture.

**CO3:** Know the applications of plant biotechnology.

**CO4:** Learn the preservation methods of cells.

**CO5:** Evaluate and discuss public and ethical concerns over the use of plant biotechnology.

**CORE PAPER –VI: GENETIC ENGINEERING AND IMMUNOLOGY (21UBT06)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Obtained knowledge, history, and development of DNA technology

**CO2:** Understand the tools and techniques of plasmids and their types.

**CO3:** Acquired information about vectors and screening and selection methods.

**CO4:** Provided knowledge of gene transfer methods and blotting techniques.

**CO5:** Design the protocols for the construction of genomic DNA.

**ELECTIVE –I: MEDICAL BIOTECHNOLOGY ( 21UBTE01 )**

**COURSE OUTCOMES (COs):**

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

**CO1:** To create postgraduates with successful careers as professionals or researchers through lifelong learning in the field of biotechnology.

**CO2:** Hands-on training and mandatory research projects will help our students by providing knowledge and technical experience of problem-solving in a research environment.

**CO3:** Students, after completing this course, can become entrepreneurs in the most demanding sectors of medical biotechnology, such as diagnostics, drug design, stem cell biology, etc.

**CO4:** Students will develop an ability to identify, organise, and answer problems in medical biotechnology.

**CO5:** Students will develop an ability to use skills and modern technological tools necessary for medical biotechnological practices.

**SBEC – III: NANOTECHNOLOGY (21UBTSO4)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Obtained knowledge of microorganisms associated with food.

**CO2:** Understand the knowledge of foodborne disease, food colour, and food allergens.

**CO3:** Acquired information about pest proofing and fumigation.

**CO4:** Provided knowledge of food engineering operations, FSSAI, and HACCP.

**CO5:** Design the protocols for analyzing the cleaning and sanitation processes.

**SEMESTER – VI**

**CORE PAPER – VIII: ANIMAL BIOTECHNOLOGY (21UBT08)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Students know about animal cell culture, media, and reagents.

**CO2:** Know about tissue engineering and organotypics.

**CO3:** Learned about gene transfer technology.

**CO4:** Know about fertilisation in animals.

**CO5:** Students know about biotechnological applications.

**CORE PAPER –X: BIOPROCESS AND ENZYME TECHNOLOGY (21UBT10)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Students will know about fermentation and sterilisation methods.

**CO2:** Know about the immobilisation of cells by bioreactors

**CO3:** Computational technology

**CO4:** Students know about biofertilizer and microbial products.

**CO5:** Learned about industrial enzymes.

**SBEC – IV: PHARMACEUTICAL BIOTECHNOLOGY (21UBTS04)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Students know about the principles of pharmacology.

**CO2:** Learned about chemotherapeutic durations.

**CO3:** Students know about synthetic therapy.

**CO4:** Know about prenatal diagnosis.

**CO5:** Students learned about tissue engineering.

**ELECTIVE – II: FOOD BIOTECHNOLOGY (21UBTE02)**

**COURSE OUTCOMES (COs):**

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

**CO1:** Students know about food preparation.

**CO2:** Learned about food-borne diseases.

**CO3:** Know about the general principle of plant layout.

**CO4:** Students know about food engineering operations.

**CO5:** Learned about the cleaning and sanitation of process plants.