

J.J. College of Arts & Science (Autonomous), Pudukkottai

Department of Biotechnology

Course Outcomes

B.Sc. Biotechnology – USBT

Course Name - Cell biology		Course Code - U1R1BTCC1
Upon Completion of the course students would be able to		
CO 1	Understand the complete nature of Cell and its Organelles in detail.	
CO 2	Provide the in depth information about the Cell division and Communication.	
CO 3	Apply their Knowledge of Cell Biology to selected changes or loss in Cell function.	
CO 4	Analyse the various factors determining the heredity from one generation to another.	
CO 5	Acquire the combined knowledge with special emphasis on molecular mechanism of heredity.	
Course Name - Biochemistry		Course Code - U1R1BTAC1
Upon Completion of the course students would be able to		
CO 1	Understand the elements which are generally involved in the biochemistry.	
CO 2	Differentiate the bio-molecules from chemistry.	
CO 3	Know the importance of vitamins and minerals requirements in our health.	
CO 4	Learn the nature of enzymes and its importance in our human life.	
CO 5	Understand the lipid metabolism and knowledge on amino acid and urea metabolism.	
Course Name – Genetics and Molecular biology		Course Code – U2R1BTCC3
Upon Completion of the course students would be able to		
CO 1	Understand the complete nature of Genes in detail.	
CO 2	Get in depth information about the Process of Genetics.	
CO 3	Apply their Knowledge of Genetics for the further studies or Research.	
CO 4	Learn the detailed mechanisms of DNA Replication	
CO 5	Understand the overall concepts of Transcription	

Course Name - Microbiology		Course Code – U2R1BTAC3	
Upon Completion of the course students would be able to			
CO 1	Analyze the milestones of Microbiology and the present status		
CO 2	Identify the key components and their functions in both prokaryotes and eukaryotes.		
CO 3	Know the various Culture media and their applications and also understand various physical and chemical means of sterilization.		
CO 4	Understand the microbial transport systems and the modes and mechanisms of energy conservation in microbial metabolism.		
CO 5	Understand the various Physical and Chemical growth requirements of bacteria and get equipped with various methods of bacterial growth measurement.		
Course Name - r - DNA technology		Course Code – U3R1BTCC5	
Upon Completion of the course students would be able to			
CO 1	Achieve a sound knowledge on methodological repertoire which allows them to innovatively apply these techniques in basic and applied fields of life science researches.		
CO 2	Understand the in-depth knowledge on Molecular Biology		
CO 3	Learn the detailed mechanisms of DNA Replication		
CO 4	Acquire the overall concepts of Genetic Engineering		
CO 5	Know the detailed application of Genetic Engineering		
Course Name – Immunology		Course Code – U3R1BTAC4	
Upon Completion of the course students would be able to			
CO 1	Get a deep foundation in the immunological processes.		
CO 2	Gain knowledge on how the immune system works and also on the immune system network and interactions during a disease or pathogen invasion.		
CO 3	Understand the antigen antibody reactions and principles of hypersensitivity.		
CO 4	Learn the vaccine production, immunohaematology and tumor immunology.		
CO 5	Compare and contrast different bacterial diseases, including the properties of different types of pathogens, and the mechanisms of pathogenesis.		

Course Name - Plant biotechnology		Course Code – U4R1BTCC7
Upon Completion of the course students would be able to		
CO 1	Gain an insight into the concepts and techniques of plant biotechnology and its application to crop plants.	
CO 2	Understand the various media, sterilization, totipotency, cell induction, organogenesis	
CO 3	Apply the techniques to develop a standard protocol for PTC	
CO 4	Have the comprehensive knowledge on GM technology, biosafety relations and germplasm storage	
CO 5	Go for further research works during M.Phil and PhD courses.	
Course Name - Biostatistics		Course Code – U4R1BTAC6
Upon Completion of the course students would be able to		
CO 1	Understand the basic concept of statistics, and also apply statistical measures which are used to analyze the data.	
CO 2	Acquire knowledge on measures of central tendency and Measures of dispersion.	
CO 3	Prepare reports to conclude the findings in data analysis.	
CO 4	Review and Extend knowledge of Measures of Dispersion.	
CO 5	Understand the concept of Skewness & kurtosis.	
Course Name – Marine biotechnology		Course Code – U4R1BTSBE1
Upon Completion of the course students would be able to		
CO 1	Aware of the commercially important Marine Products	
CO 2	Acquire knowledge of Toxin Degradation.	
CO 3	Understand the Diseases and Quality Management	
CO 4	Know the value, production, application and marine products.	
CO 5	Learn the water quality management.	

Course Name - Bioinstrumentation		Course Code – U5R1BTCC9
Upon Completion of the course students would be able to		
CO 1	Understand the general laboratory procedures and maintenance of research equipments viz. Microscopy, pH meter, Spectroscopy, Electrophoresis.	
CO 2	Learn to separate amino acids and sugars using paper & thin layer chromatography.	
CO 3	Get knowledge about the principle of flame photometer and bomb calorimeter.	
CO 4	Realize the principle and applications of gas liquid chromatography and HPLC.	
CO 5	Acquire knowledge about the principles and applications of electrophoresis	
Course Name - Bioinformatics		Course Code – U5R1BTCC10
Upon Completion of the course students would be able to		
CO 1	Do the sequence analysis and phylogenetic prediction with their own knowledge.	
CO 2	Get knowledge of the protein sequence and their databases.	
CO 3	Analyses the genome and its sequence.	
CO 4	Understand the structural information in the databases.	
CO 5	Helps to ensure the sequence analysis work successfully without any error.	
Course Name – Pharmaceutical biotechnology		Course Code – U5R1BTMBE1
Upon Completion of the course students would be able to		
CO 1	Elucidate scientific principles for Biotechnology in pharmaceutical product development	
CO 2	Understand the components of, and challenges in development of biologicals and drugs in the pharmaceutical and Biotechnology industry	
CO 3	Understand the economic values of pharmaceutical products	
CO 4	Know the pharmaceutical regulations	
CO 5	Connect the link between pharmacodynamics and toxicity	

Course Name - Medical laboratory technology	Course Code - U5R1BTSBE2
Upon Completion of the course students would be able to	
CO 1	Assist physicians in the diagnosis and treatment of diseases
CO 2	Acquire knowledge about prevention and diagnosis of diseases
CO 3	Learn to work in hospitals or doctors office
CO 4	Understand the disease diagnosis.
CO 5	Acquire knowledge about the principles of clinical sample collection
Course Name - Animal biotechnology	Course Code - U6R1BTCC12
Upon Completion of the course students would be able to	
CO 1	Gain an insight into the concepts and techniques of animal biotechnology and its wide industrial and medicinal applications.
CO 2	Acquire knowledge on GMO and production of useful compounds
CO 3	Know the production of vaccine
CO 4	Understand the concepts and methods in Genetic engineering
CO 5	To go for further research works during M.Phil and PhD courses
Course Name – Environmental biotechnology	Course Code - U6R1BTCC13
Upon Completion of the course students would be able to	
CO 1	The students will, obtain knowledge on basic principles and technologies of decontamination of persistent organic pollutants mainly by means of the biological approaches
CO 2	The students will know about the principles and techniques underpinning the application of biosciences to the environment
CO 3	Realize the waste management and sewage treatment systems
CO 4	Acquire knowledge on bioremediation and microbial leaching
CO 5	Know the Biosafety and environmental monitoring regulations

Course Name - Food and industrial biotechnology		Course Code - U6R1BTMBE2
Upon Completion of the course students would be able to		
CO 1	Construct the framework to establish a Bioreactor set up.	
CO 2	Integrate downstream processing after upscale execution.	
CO 3	Understand the essentials for Bioprocess Technology in microbiologists perspective	
CO 4	Discuss the theory and mathematics behind microbial growth	
CO 5	Be able to understand in depth the techniques/process used in microbial products using fermentation technology	
Course Name - Nanobiotechnology		Course Code - U6R1BTMBE3
Upon Completion of the course students would be able to		
CO 1	Understanding about the fundamentals of nanotechnology in biomedical and biological research.	
CO 2	Use and make nanomaterials.	
CO 3	Learn the principles of spectroscopy	
CO 4	Get the know the nanotechnology mechanism and related events of microbes	
CO 5	Acquire knowledge on physiological response of nanoproducts	
Course Name – Mushroom cultivation and value addition		Course Code - U6R1BTSBE3
Upon Completion of the course students would be able to		
CO 1	Understand the prospects of mushrooms and its cultivation.	
CO 2	Gain the knowledge of cultivation of different types of edible mushrooms.	
CO 3	Develop the self-confidence for embarking on self employment.	
CO 4	Learn the mushroom characteristics and their importance	
CO 5	know the principles and methods involved in different stages of mushrooms	
CO 6	Apply their knowledge in cultivating various tropical and subtropical mushrooms and their role in human welfare.	

PRACTICALS	
Course Name -Major Practical-I (Covering CC-1)	Course Code - U1R1BTCC2P
Upon Completion of the course students would be able to	
CO 1	Develop deeper understanding of what life is and how it functions at cellular level.
CO 2	Describe cellular membrane structure and function, fine structure and function of cell organelles.
CO 3	Perform a variety of molecular and cellular biology techniques
CO 4	Differentiate the cells of various living organisms and get awareness of physiological processes of cell e.g. cell divisions
CO 5	Observe and correctly identify different cell types, cellular structures using different microscopic techniques.
Course Name -Major Practical-II (Covering CC-3)	Course Code - U2R1BTCC4P
Upon Completion of the course students would be able to	
CO 1	learn DNA replication, recombination and repair, transcription and translation CO2. CO3.
CO 2	aware of the modern tools and techniques of genomics and isolation and identification of genes
CO 3	understand the biology and application of antisense technologies and biology of cancer
CO 4	Get the know the differences between the DNA of microbes and plants
CO 5	Acquire knowledge on plasmid and its applications
Course Name – Allied Practical-II (Covering AC1 and AC3)	Course Code - U2R1BTAC2P
Upon Completion of the course students would be able to	
CO 1	Understand the details of Structure, Functions and applications of micro-organisms
CO 2	Know the skills in handling micro-organisms lab.
CO 3	Gain the applications of micro-organisms in industry, health care, environmental protection, food agriculture and research.
CO 4	Equip themselves with the basic bio-chemical techniques which can later applied for their lab research and also for many other industrial researches.
CO 5	Track various techniques adopted for separation of biomolecules

Course Name - Major Practical - III (Covering CC-5)		Course Code – U3R1BTCC6P
Upon Completion of the course students would be able to		
CO 1	Isolate DNA from various sources - viz microbes, plants and animals	
CO 2	Understand the optimal conditions essential for protein/nucleic acids separation and purifications.	
CO 3	Comprehend the skills required to do experimental cloning.	
CO 4	Know the introduction of genes in microbes, plants and animals.	
CO 5	Acquire knowledge on scientific understanding about the applications of rDNA in life science research.	
Course Name - Major Practical - IV (Covering CC - 7)		Course Code – U4R1BTCC8P
Upon Completion of the course students would be able to		
CO 1	Gain in sight into the concepts and techniques of Plant biotechnology and its application to crop plants.	
CO 2	Summarize the methods used to produce transgenic plants and explain the selection process for identifying transformed plant cells.	
CO 3	Understand the principles of protoplasmic isolation, callus formation and micro propagation.	
CO 4	Know the principles of preparation of tissue culture media.	
CO 5	Analyse the applications of transgenic plants in the field of agriculture.	
Course Name – Allied Practical - IV (Covering AC 4 & 5)		Course Code – U4R1BTAC5P
Upon Completion of the course students would be able to		
CO 1	Demonstrate the ag-ab relationships and their detection methods.	
CO 2	Gain knowledge on how to do transplantation, blood transfusion and MHC test.	
CO 3	Have hands on training for various immunological techniques.	
CO 4	Know the multi variate analysis in biostatistics.	
CO 5	Track the statistical tools like mean, median and mode in bio research.	

Course Name - Major Practical - V (Covering CC 9& 10)		Course Code - U5R1BTCC11P
Upon Completion of the course students would be able to		
CO 1	Equip themselves with the basic instrumentation to be prepared in the laboratory.	
CO 2	Understand the principles and functions of instruments like centrifuge, spectrophotometer and chromatography.	
CO 3	Understand the common methods and software used in bioinformatics.	
CO 4	Store and retrieve drug related information using online tools.	
CO 5	Comprehend the utility of tools and databases available in genomics and proteomics.	
Course Name - Major Practical - VI (Covering CC 12 & 13)		Course Code - U6R1BTCC14P
Upon Completion of the course students would be able to		
CO 1	Determine the total hardness, chlorine, COD and BOD of different water sample.	
CO 2	Track the quality of water by MPN method.	
CO 3	Gain in sight into the concepts and techniques of animal biotechnology.	
CO 4	Acquire the basic principles and techniques in genetic manipulation of animal cells.	
CO 5	Able to describe techniques and problems both technical and ethical in animal cloning.	