

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

## Department of Biotechnology

### Course Outcomes

#### M.Sc. Biotechnology – MSBT

<b>Course Name - Microbiology</b>		<b>Course Code - P1R1BTCC1</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Acquire knowledge on different structure and characteristics of microbes	
<b>CO 2</b>	Understand the applied microbiology in detail.	
<b>CO 3</b>	Receive the knowledge of beneficial microorganisms in the environment and the application to benefit mankind.	
<b>CO 4</b>	List and describe the mechanisms of action of major chemotherapeutic agents that control microorganisms.	
<b>CO 5</b>	Gain the knowledge about the factors responsible for the virulence of different pathogenic microorganisms.	
<b>Course Name - Biochemistry</b>		<b>Course Code - P1R1BTCC2</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Impart the complete knowledge about structure and function of different biomolecules (proteins, lipids, nucleic acids, and carbohydrates) found in living cells.	
<b>CO 2</b>	Provide the knowledge how biomolecules are synthesized and metabolized inside living cells.	
<b>CO 3</b>	Acquire knowledge on the building blocks of the macromolecules, their chemical properties and their modification and their importance in normal functioning of living organisms.	
<b>CO 4</b>	Understand the metabolic pathways and identify how the genetic abnormalities disturb the normal homeostasis and link with pathological conditions	
<b>CO 5</b>	Get the applications of biochemistry in medicine, agriculture, and pharmaceuticals	
<b>Course Name – Genetics and Molecular Biology</b>		<b>Course Code – P1R1BTCC3</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	Describe the basic structure and biochemistry of nucleic acids and proteins and discriminate between them;	
<b>CO 2</b>	Identify the principles of DNA replication, transcription and translation and explain how they relate to each other.	
<b>CO 3</b>	Discuss clearly about gene organization and mechanisms of control the gene expression in various organisms.	
<b>CO 4</b>	Articulate applications of molecular biology in the modern world.	
<b>CO 5</b>	Comprehend the genetic transfer methods and gene mapping, gene structure analysis, transposons types, nomenclature and their	

	<b>mechanism.</b>
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<b>Course Name - Stem Cells and Nanobiotechnology</b>		<b>Course Code – P1R1BTEC1</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Gain knowledge on stem cells and their applications.</b>	
<b>CO 2</b>	<b>Gives understanding about the fundamentals of nanotechnology in biomedical and biological research.</b>	
<b>CO 3</b>	<b>Learn about the background on Nanoscience</b>	
<b>CO 4</b>	<b>Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment</b>	
<b>CO 5</b>	<b>Apply their learned knowledge to develop Nanomaterial's</b>	
<b>Course Name - Food and Industrial Biotechnology</b>		<b>Course Code – P2R1BTCC5</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire the knowledge of understanding of relevance of food components,</b>	
<b>CO 2</b>	<b>Understanding the detection techniques in food.</b>	
<b>CO 3</b>	<b>Acquire an understanding in industrial operations in food, role of microbes</b>	
<b>CO 4</b>	<b>Give a specific focus on bioremediation and treatment of polluted effluent.</b>	
<b>CO 5</b>	<b>Provide the conceptual knowledge and significance of genetically modified microbes.</b>	
<b>Course Name – Bioinstrumentation</b>		<b>Course Code – P2R1BTCC6</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Understand the general laboratory procedures and maintenance of research equipments, microscopy, pH meter and preparation of different buffers</b>	
<b>CO 2</b>	<b>Describe the pH measurement in soil and water samples</b>	
<b>CO 3</b>	<b>Isolate cellular constituents</b>	
<b>CO 4</b>	<b>Realize the need of centrifuges and their uses in research</b>	

<b>CO 5</b>	<b>Understand how to separate amino acids and sugars using paper &amp; thin layer chromatography</b>
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<b>Course Name - Genetic Engineering</b>		<b>Course Code – P2R1BTCC7</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Achieve a sound knowledge on methodological repertoire which allows them to innovatively apply these techniques in basic and applied fields of life science researches.</b>	
<b>CO 2</b>	<b>Think about the basics of recombinant DNA technology</b>	
<b>CO 3</b>	<b>To understand the role, use and types of different DNA modifying enzymes viz. Polymerases, Nucleases, restriction endonuclease, ligases etc.</b>	
<b>CO 4</b>	<b>Acquire basic knowledge of DNA sequencing methods from conventional (Sanger sequencing) to High throughput Next generation sequencing technology, their principle, chemistry, theory and types.</b>	
<b>CO 5</b>	<b>Gain the knowledge the strategies and steps involved in construction of genomic and cDNA library, essential tools and role of each and every constituents</b>	
<b>Course Name - Immunology and Immunotechnology</b>		<b>Course Code – P2R1BTCC8</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Get deep foundation in the immunological processes.</b>	
<b>CO 2</b>	<b>Gain knowledge on how the immune system works and also on the immune system network and interactions during a disease or pathogen invasion.</b>	
<b>CO 3</b>	<b>Explain role of immune cells and their mechanism in preventing the body from foreign attack and infectious disease, cancer and other disease development.</b>	
<b>CO 4</b>	<b>Apply the knowledge of immune associated mechanisms in medical biotechnology research.</b>	
<b>CO 5</b>	<b>Design experiment to see effect of drug molecule on immune response</b>	
<b>Course Name – Biostatistics</b>		<b>Course Code – P2R1BTEC2</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Interpret results of descriptive statistics methods effectively.</b>	
<b>CO 2</b>	<b>Demonstrate an understanding of the central concepts of Regression Analysis</b>	

<b>CO 3</b>	<b>Discuss the relation between Binomial and Poisson Distribution</b>
<b>CO 4</b>	<b>Interpret results of the principal methods of statistical inference and design.</b>
<b>CO 5</b>	<b>Communicate the results of statistical analysis accurately and effectively.</b>
<b>Course Name - Research Methodology</b>	
<b>Course Code – P3R1BTCC10</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	<b>Get knowledge on research proposal preparation and apply to the sponsoring agencies.</b>
<b>CO 2</b>	<b>Benefits through socio-research networks.</b>
<b>CO 3</b>	<b>Understanding of the history and methodologies of scientific research, applying these to recent published papers</b>
<b>CO 4</b>	<b>Understanding and practicing scientific reading, writing, presentations</b>
<b>CO 5</b>	<b>Know the scientific ethics through case studies.</b>
<b>Course Name - Plant Biotechnology</b>	
<b>Course Code – P3R1BTCC11</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	<b>Gain an insight into the concepts and techniques of Plant Biotechnology and its application to crop plants.</b>
<b>CO 2</b>	<b>Familiar with sterile techniques, media preparation, DNA extraction methods, and isolation of specific gene</b>
<b>CO 3</b>	<b>Apply tissue culture techniques for the large scale production of food crops and medicinal plants with economically useful traits.</b>
<b>CO 4</b>	<b>Acquire knowledge of molecular markers for the identification of traits in various genomes.</b>
<b>CO 5</b>	<b>Apply genetic engineering concepts to induce biotic and abiotic stresses in plants</b>
<b>Course Name – Animal Biotechnology</b>	
<b>Course Code – P3R1BTCC12</b>	
<b>Upon Completion of the course students would be able to</b>	
<b>CO 1</b>	<b>Gain an insight into the concepts and techniques of animal biotechnology and its wide industrial and medicinal applications.</b>
<b>CO 2</b>	<b>Describe the mechanism of gene therapy and its uses.</b>
<b>CO 3</b>	<b>Understand how different blood products like antibodies, hormones and vaccines are produced industrially.</b>
<b>CO 4</b>	<b>Learn the features of stem cell and their application.</b>

<b>CO 5</b>	<b>Differentiate between the different methods adopted for generating transgenic animals</b>
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<b>Course Name - Practical-I (Covering CC1,CC2 &amp; CC3)</b>		<b>Course Code - P1R1BTCC4P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Understanding the concepts of Staining techniques.</b>	
<b>CO 2</b>	<b>Apply their learned knowledge for the preparation of Media.</b>	
<b>CO 3</b>	<b>Learn the handling of Microscopes and the identification of Microorganisms.</b>	
<b>CO 4</b>	<b>Acquire knowledge regarding the analysis of Biomolecules.</b>	
<b>CO 5</b>	<b>Gain the knowledge about the isolation and the estimation of DNA.</b>	
<b>Course Name - Practical -II (Covering CC5,CC6,CC7 &amp; CC8)</b>		<b>Course Code - P2R1BTCC9P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire hands on experience on the production and estimation of organic acids, alcohol etc.</b>	
<b>CO 2</b>	<b>Acquire the experience of the Chromatographic techniques.</b>	
<b>CO 3</b>	<b>Understand the immunological techniques.</b>	
<b>CO 4</b>	<b>Perform Gel Electrophoresis.</b>	
<b>CO 5</b>	<b>Gain experience in understanding Blotting techniques.</b>	
<b>Course Name – Practical -III (Covering CC11, CC12 &amp; CC13)</b>		<b>Course Code – P3R1BTCC14P</b>
<b>Upon Completion of the course students would be able to</b>		
<b>CO 1</b>	<b>Acquire knowledge about the preparation of plant tissue culture media.</b>	
<b>CO 2</b>	<b>Understand the Callus culture and Anther culture by performing it.</b>	
<b>CO 3</b>	<b>Gain the knowledge for the preparation of Animal cell culture media.</b>	
<b>CO 4</b>	<b>Perform the experiments for the estimation and determination of Minerals.</b>	
<b>CO 5</b>	<b>Apply the learned knowledge for the analysis of water.</b>	