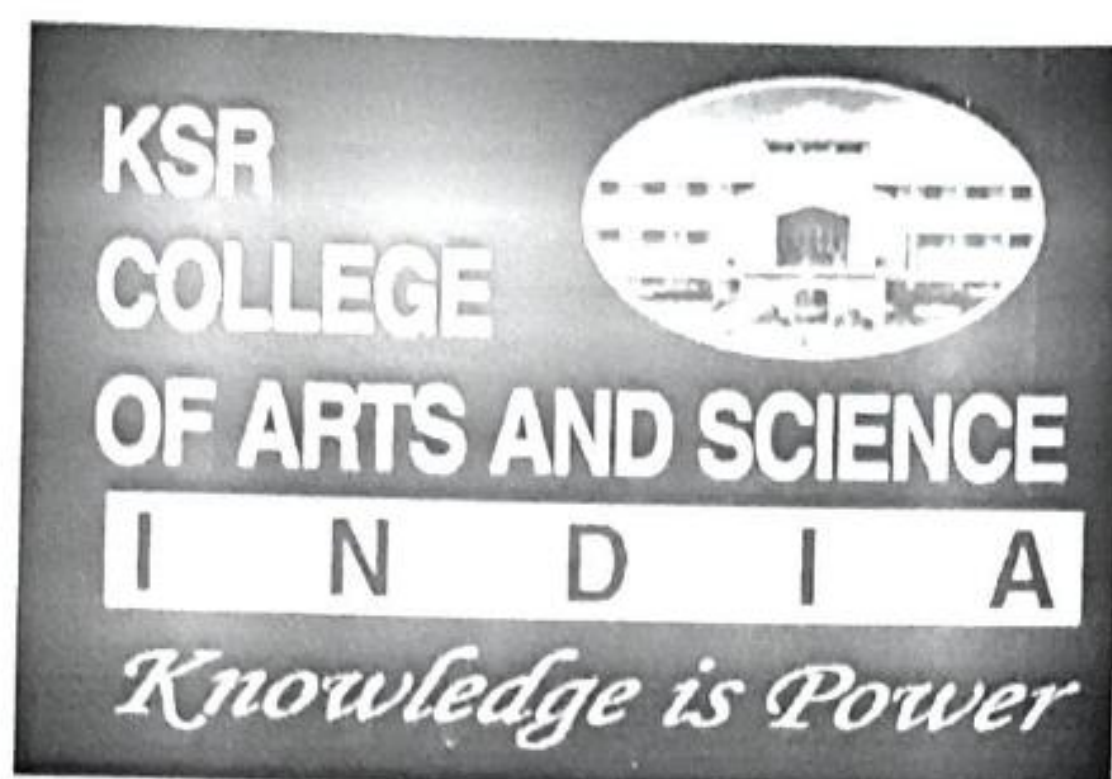


K.S.Rangasamy College of Arts & Science (Autonomous), Tiruchengode 637215

Department of Biotechnology



## MASTER OF SCIENCE (BIOTECHNOLOGY)

### PROGRAMME OUTCOMES (PO)

After completion of the programme, the graduates will be able to

PO1: Use the basic knowledge towards applied Plant/ Animal/ Environmental Biotechnology.

PO2: Design processes / products for Biotechnology Industries.

PO3: Design, analyze and interpret data for investigating research problems in biotechnology and other fields.

PO4: Justify societal, health, safety and legal issues and understand his responsibilities in biotechnological practices.

PO5: Take up independent / team research in a multidisciplinary environment and the outcome of the course will make the student ready for lifelong learning of Biotechnology.

### PROGRAMME SPECIFIC OUTCOMES (PSO)

After completion of the programme, the graduates will be able to

PSO 1: Apply the knowledge of Biotechnology in the domain of environmental, immunology, agriculture, healthcare and, molecular mechanics in Bioindustry.

PSO 2: Solve the complex problem in the field with a understanding of societal, legal and cultural impact of the solution.

PSO 3: Apply the contextual knowledge of Biotechnology to function effectively as an individual or leader in multidisciplinary domain of Biotechnology.

PSO 4: Predict, formulate, demonstrate, analyze and interpret data for integrating research problem in life science domain.

PSO 5: Synthesis, compare, evaluate, classify, integrate and effectively apply the basic laws, principles, phenomena, process and mechanism involved in the domain of Biotechnology.

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## SEMESTER - I

1SPBTM101	CORE I: CELL BIOLOGY
CO1	Explain the cytoskeletal activities of cell.
CO2	Differentiate the basic cellular organelles those constitute the cells.
CO3	Demonstrate the cytoskeleton system and motility of the cell
CO4	Illustrate the nuclear ingredients and its arrangements
CO5	Explain the process of cell cycle and Cell death.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	H	H	H	L	M	H	H
CO2	M	H	H	M	H	H	M	M	H	H
CO3	H	M	H	M	M	H	H	H	M	M
CO4	M	H	M	H	H	H	M	M	M	M
CO5	H	H	H	M	H	H	H	M	L	M

H-High; M-Medium; L-Low

  
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18PBTM102	CORE II: MOLECULAR BIOLOGY
CO1	Compute with the concepts of central dogma of molecular concepts and structures of the genetic materials
CO2	Analyze the mechanism behind the mutations and repair methods in cell
CO3	Demonstrate the background of the transfer of genetic information from parent to daughter and their modification systems
CO4	Criticize the protein formations and modifications it taking for actions in cellular levels
CO5	Develop knowledge about the genetic level changes for protein and enzyme functioning

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	M	L	L	M	M	H
CO2	L	M	L	M	H	L	M	M	M	H
CO3	M	H	H	L	M	M	M	M	M	L
CO4	M	H	M	H	H	M	M	L	H	H
CO5	H	H	L	M	M	H	H	H	L	L

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CORE III: MICROBIOLOGY AND GENETICS	
18PBTM103	
CO1	Explain about the microbiological concepts and microbial classification techniques.
CO2	Demonstrate about Design new microbial cell culture media and its applications.
CO3	Gain knowledge about concepts of microorganisms and its resistance capability and antibiotics mode of action.
CO4	Explain about the fundamental genetics concepts and genome mapping.
CO5	Describe the importance of genetics, knowledge about solve Human genetic diseases.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	L	H	L	H	M	M	H	L
CO2	M	H	H	M	H	M	H	M	L	L
CO3	H	L	H	H	H	H	H	L	M	M
CO4	M	M	L	H	M	M	M	H	H	M
CO5	H	L	H	M	L	M	L	M	H	H

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<b>1SPBTM104</b>	<b>CORE IV: BIOCHEMISTRY</b>
<b>CO1</b>	Demonstrate the carbohydrates and its types.
<b>CO2</b>	Explain about classification of protein, lipids and nucleic acid.
<b>CO3</b>	Explain the concept of metabolism and catabolism
<b>CO4</b>	Illustrate the different structure, classification and function of the activity of enzymes
<b>CO5</b>	Describe the types and biological function of vitamins and hormones.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	H	M	H	H	M	M	H	H	H	H
<b>CO2</b>	H	H	M	H	H	M	M	H	M	M
<b>CO3</b>	M	H	H	M	H	M	H	H	M	H
<b>CO4</b>	H	H	M	H	H	M	M	M	M	H
<b>CO5</b>	M	H	M	H	M	H	H	H	M	H

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ISPBTM105	CORE V: DEVELOPMENTAL BIOLOGY
CO1	Explain historical perspective of Developmental biology.
CO2	Demonstrate the fundamentals of Development biology.
CO3	Differentiate gametogenesis, fertilization and early development.
CO4	Illustrate the organogenesis in plants.
CO5	Illustrate the sex determination and evolution.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	L	M	H	M	M	M	H
CO2	M	H	M	H	H	H	H	M	M	H
CO3	H	H	L	H	M	H	M	L	M	M
CO4	H	M	H	H	H	H	H	M	H	L
CO5	M	M	H	L	M	M	H	M	M	M

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**SEMESTER - II**

18PBTM201	CORE VI: IMMUNOLOGY
CO1	Describe the features of cells and tissues of the immune system and differentiate immunogens, antigens, haptens and adjuvants with respect to immunological functions.
CO2	Explain about the structure of immunoglobulin and apply the mechanism of biology of antigen processing and presentation.
CO3	Illustrate the developmental behaviors of B cells and study antigen and antibody interaction.
CO4	Describe the injury and inflammation and the broad education necessary to understand AIDS. And understand the mechanism of immune responses with respect to transplantation and graft rejection.
CO5	Identify modern techniques to analyze tumor antigens and study autoimmune diseases. And to develop the monoclonal antibodies through hybridoma technology for humoral immunity.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	L	M	L	H	M	M	M	L
CO2	L	M	H	H	M	M	M	H	L	L
CO3	H	M	H	L	M	M	L	L	M	H
CO4	M	L	H	H	H	L	M	H	M	H
CO5	L	H	M	L	H	L	M	L	H	M

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18PBTM202	CORE VII: BIOPROCESS TECHNOLOGY
CO1	Apply the basic knowledge of fermentation process.
CO2	Explain about Overview of the medium for industrial fermentation and Growth kinetics.
CO3	Demonstrate the different phases of mass transfer.
CO4	Describe about the different bioprocess control and monitoring methods.
CO5	Explain the separation process of microbial cells from various techniques.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	H	M	M	M	M	M
CO2	H	H	H	H	M	M	H	M	M	M
CO3	M	M	H	H	H	M	H	H	H	M
CO4	H	H	M	H	M	M	M	H	M	H
CO5	H	M	H	M	H	M	H	H	H	H

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18PBTEL201	ELECTIVE I: CELL COMMUNICATION AND SIGNALING
CO1	Apply the basic knowledge of Host parasite interaction.
CO2	Explain about cell signaling.
CO3	Describe about cell communication.
CO4	Demonstrate the types of receptors and immune response during microbial infection.
CO5	Explain about cancer.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	M	H	H	M	M	L	L
CO2	M	H	M	H	M	M	H	M	L	L
CO3	H	L	M	H	H	H	M	L	M	H
CO4	H	L	H	H	L	H	M	H	M	M
CO5	M	H	M	H	M	M	L	M	H	H

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18PBTEL202	ELECTIVE I: BIOINSTRUMENTATION AND BIOINFORMATICS
CO1	Maintain the instruments with care and know the working principles of each basic laboratory instruments.
CO2	Gain knowledge about the separation process using electrophoresis and chromatographic techniques.
CO3	Handle the instruments and measure OD value, Absorbance and concentration of specific constituents present in the unknown sample.
CO4	Interpret the biological data in computational methods & tools for solving research problems easily.
CO5	Predict the gene structure and also construct phylogenetic tree for studying the similarity and evolutionary relationship within the organism.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	L	M	H	H	M	L	L
CO2	M	H	M	H	M	H	H	L	M	L
CO3	H	M	H	H	H	H	M	L	M	H
CO4	M	L	H	H	L	L	L	H	M	M
CO5	H	M	L	H	M	L	L	M	H	L

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<b>18PBCBT1201</b>	<b>INTERDISCIPLINARY COURSE I: DIAGNOSTIC BIOCHEMISTRY</b>
<b>CO1</b>	Practice the safe laboratory processes and reagent preparations
<b>CO2</b>	Explain the general concepts of specimen handling methods and analysis of blood cells in clinical labs
<b>CO3</b>	Recite the handling and analytical procedures of urine and stool samples
<b>CO4</b>	Describe the general concepts in diagnosis of diabetes mellitus
<b>CO5</b>	Perform various laboratory procedures to assess the functional status of the Organs

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	L	M	H	M	L	H	H
CO2	H	H	M	H	H	H	M	L	H	H
CO3	L	M	H	L	M	H	M	L	H	H
CO4	H	H	M	H	H	H	M	L	H	H
CO5	H	M	H	L	M	H	M	L	H	H

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18PMBBTI201	INTERDISCIPLINARY COURSE I: CLINICAL MICROBIOLOGY
CO1	Evaluate the infectious disease caused by microorganisms.
CO2	Apply the methods of collection and processing of clinical samples.
CO3	Apply the preliminary detection of pathogens for disease diagnosis.
CO4	Assess the serological detection of pathogens.
CO5	Develop diagnose the disease based on molecular methods.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	H	M	H	H	H	H	H
CO2	H	M	H	H	H	M	H	H	H	H
CO3	H	H	H	M	H	M	M	H	H	H
CO4	M	H	H	H	H	M	M	H	H	H
CO5	H	M	H	H	M	H	H	H	H	H

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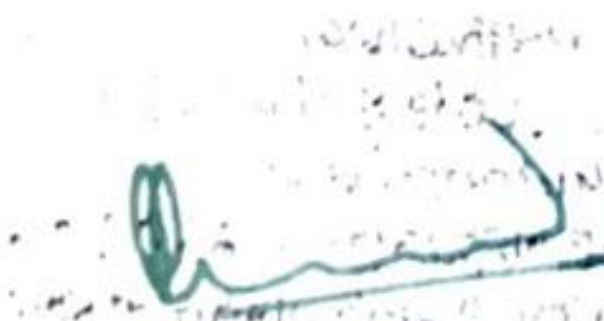
**SEMESTER - III**

<b>18PBTM301</b>	<b>CORE VIII: PLANT TISSUE AND ANIMAL CELL CULTURE TECHNOLOGY</b>
<b>CO1</b>	Distinguish the cells and organs of the plants and stress management by the plants.
<b>CO2</b>	Explain about different types of culture techniques and to experiment with them.
<b>CO3</b>	Differentiate the functions of phytohormones and phytochemicals.
<b>CO4</b>	Handle the equipments used in Animal Cell culture technology.
<b>CO5</b>	Attain the knowledge on culturing of animal cell lines.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	L	H	M	H	M	M	L	L
CO2	H	H	M	H	L	H	M	H	L	M
CO3	M	L	M	H	M	H	M	H	M	H
CO4	H	M	H	H	L	M	L	H	L	L
CO5	H	M	H	L	H	H	L	H	L	M

H-High; M-Medium; L-Low

  
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18PBTM302	CORE IX: GENETIC ENGINEERING
CO1	Describe the types of enzymes used in genetic engineering.
CO2	Demonstrate the types of vectors used in genetic engineering and different strains used.
CO3	Explain about the construction of gene libraries and screen the recombinants.
CO4	Apply the various strategies involved in gene cloning.
CO5	Apply their knowledge in the genetic engineering application.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	H	H	L	H	H	L	L	M
CO2	H	H	H	M	H	H	M	M	L	H
CO3	H	M	L	H	H	M	H	M	M	L
CO4	H	H	M	M	H	H	H	M	M	H
CO5	M	H	M	H	M	H	H	L	M	H

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18PBTM303	CORE X: BIOSTATISTICS AND RESEARCH METHODOLOGY
CO1	Learn the importance of statistics and Understand the concepts of measures of central tendency and measures of dispersion
CO2	Gain knowledge on correlation and regression analyses
CO3	Test the research statements through ANOVA.
CO4	Select the appropriate procedure for carrying out their research work
CO5	Understand the concepts in writing thesis, proposal and result interpretation

#### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	M	H	M	L	H	M	H	H
CO2	L	H	M	H	H	L	M	L	H	H
CO3	M	H	M	M	M	L	H	M	H	H
CO4	H	L	H	H	H	H	M	H	H	H
CO5	M	H	L	M	M	H	M	M	H	H

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1SPBCBTI301	INTER DISCIPLINARY COURSE II: PHARMACEUTICAL BIOCHEMISTRY
CO1	Describe the drug sources, classification and its pharmacodynamics
CO2	Explain the mechanisms of action and fate of drugs inside living organisms
CO3	Analyze the effects of adverse drug reactions
CO4	Appreciate the various medical systems that utilize phytoconstituents as Medicines
CO5	Explore the new strategies in the development of efficient drugs to combat diseases from plants

#### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	H	M	M	H	M	M	H	H
CO2	M	H	H	H	H	H	M	M	H	H
CO3	H	H	M	H	H	H	M	M	H	H
CO4	H	M	H	H	M	H	M	M	H	H
CO5	M	H	M	M	H	H	M	M	H	H

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### SEMESTER - IV

18PBTM401	CORE XI: FOOD AND PHARMACEUTICAL BIOTECHNOLOGY
CO1	Explain dietary sources and fermented food products.
CO2	Illustrate the production of beverages, food colorants as well as factors responsible for food spoilage.
CO3	Demonstrate the principles and methods of food preservation.
CO4	Know the production, manufacturing of antibiotics and drugs and tablet packaging.
CO5	Learn the role of FDA, drug metabolism and pharmacology.

#### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	L	H	M	H	H	L	L	M
CO2	H	M	M	H	H	H	M	M	L	H
CO3	L	H	H	M	H	M	H	M	M	L
CO4	M	H	M	M	M	H	H	M	M	H
CO5	H	M	L	L	H	H	H	L	M	H

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18PMBBTI301	INTER DISCIPLINARY COURSE II : INDUSTRIAL MICROBIOLOGY
CO1	Recall the basics and importance of industrially important microbes.
CO2	Apply the techniques for the formulation of media for microbial products.
CO3	Develop the suitable conditions for maximum product yield.
CO4	Apply fermentation technology for production of microbial products.
CO5	Demonstrate chemotherapeutic drugs production under <i>in vitro</i> conditions.

#### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	L	M	L	H	M	L	L	L	H	H
CO2	M	L	H	H	H	L	L	L	H	H
CO3	M	H	H	M	H	L	M	M	H	H
CO4	L	M	L	H	H	L	M	M	H	H
CO5	M	H	M	H	M	H	H	H	H	H

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18PBTEL402	ELECTIVE II: EVOLUTION AND BIODIVERSITY
CO1	Explain about Lamarckism, Darwin concepts and evolutionary tree.
CO2	Attain knowledge about evolution, photosynthesis and metabolism.
CO3	Explain about Paleontology and Evolutionary History.
CO4	Describe about taxonomy.
CO5	Attain knowledge about Conservation strategies and Biodiversity.

### MAPPING

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	L	M	L	L	M	L	L	L	L
CO2	M	M	L	M	M	M	L	L	L	M
CO3	L	M	M	H	H	M	H	L	M	L
CO4	H	H	L	M	L	H	L	L	M	L
CO5	H	M	L	L	H	H	H	M	L	M

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1SPBTEL401	<b>ELECTIVE II: ENVIRONMENTAL BIOTECHNOLOGY</b>
CO1	Solve the environmental issue through biotechnological approaches.
CO2	Treat the industrial waste water by biological treatment.
CO3	Apply bioremediation to the contaminated soil and water.
CO4	Use microbes to leach metals and to produce biogas.
CO5	Manage the hazardous waste and to detoxify them.

**MAPPING**

PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	M	M	M	H	M	H	M	H	M
CO2	M	H	L	L	M	M	H	M	M	L
CO3	M	H	M	H	H	H	H	M	H	M
CO4	H	M	H	M	M	H	M	L	M	M
CO5	M	L	M	H	M	H	M	L	H	M

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