

# MASTER OF SCIENCE (BIOCHEMISTRY)

## PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

<b>PEO 1:</b>	To intend in providing quality education to the students to be more inventive and adaptable personalities in the field of Life Science.
<b>PEO 2:</b>	To enable the students to develop an interdisciplinary approach for understanding the life science problems at the molecular level.
<b>PEO 3:</b>	To provide guidance in developing the students' reasoning ability to assess and relate the biochemical issues related to environment and society.

## PROGRAMME OUTCOMES (PO)


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


<b>PO 1:</b>	Demonstrate excellence in the field of Biochemistry by understanding the fundamentals of biochemical principles
<b>PO 2:</b>	Expertise in problem solving, critical thinking and analytical reasoning in the field of science
<b>PO 3:</b>	Appreciate and practice the ethical principles in scientific research
<b>PO 4:</b>	Deliver excellence in their field of career with constant updations
<b>PO 5:</b>	Excel themselves to appear for discipline specific competitive exams

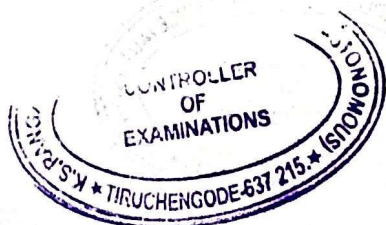
## PROGRAM SPECIFIC OUTCOMES (PSO)

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

<b>PSO 1:</b>	Apply the knowledge of science in the domain of Biochemistry and understand the functions of biological molecules through the study of their molecular structure.
<b>PSO 2:</b>	Realize the chemical and regulatory processes of major cellular functions.
<b>PSO 3:</b>	Discriminate the integration between different components of living system, physiological homeostasis and the effect of its alterations.
<b>PSO 4:</b>	Use current biochemical and molecular techniques to plan and carry out experiments and get conclusion drawn from experimental data.
<b>PSO 5:</b>	Identify, explore and develop a successful career both in industrial and higher education domains.

  
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## COURSE OUTCOMES (CO)

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

18PBCM101	CORE I: CHEMISTRY OF BIOPOLYMERS
CO1	Illustrate the complex structure of polysaccharides, their properties and role in Bacterial Cell wall and Blood group substances
CO2	Explain the classification of proteins and the forces involved in the structural organization of the same
CO3	Analyze various structural proteins, their evolution and their biological importance
CO4	Assess the classification, structure and the role of various lipids in biological system
CO5	Explore the types, interactions and significance of genetic materials

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


H-High; M-Medium; L-Low

18PBCM102	CORE II: ANALYTICAL BIOCHEMISTRY
CO1	Explain the basic concepts of pH and buffers for the study of Biochemical nature of cells
CO2	Customize the techniques in separation of Biological components based on the principle of centrifugation and electrophoresis
CO3	Perform chromatographic techniques for the partition of cellular components
CO4	Apply the techniques for the quantification of components using light spectrum
CO5	Analyze the components using electromagnetic techniques



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CO1	H	L	M	H	H	H	M	M	H	H
CO2	H	L	M	H	H	H	H	M	H	H
CO3	H	L	M	H	H	H	H	M	H	H
CO4	H	L	M	H	H	H	H	M	H	H
CO5	H	L	M	H	H	H	H	M	H	H

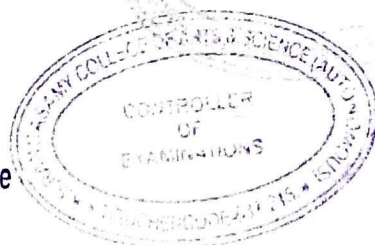
H-High; M-Medium; L-Low

18PBCM103	CORE III: ENZYME CATALYSIS AND REGULATION
CO1	Characterize the enzymes in each enzymatic class, examples of such enzymes and their isolation and purification procedures in practice
CO2	Assess the relationship between properties and structure of the enzymes, their mechanism of action and kinetics of enzymatic reactions
CO3	Recite the enzyme catalysis and role of coenzymes
CO4	Relate the regulatory mechanisms of enzyme activity which involve in the maintenance of body's homeostasis
CO5	Choose the correct enzymes for application in industry by realizing their future potential

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

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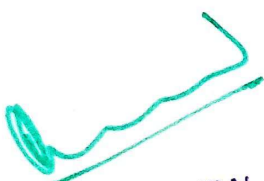
  
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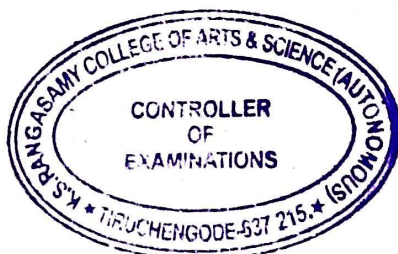
18PBCM104	CORE IV: MOLECULAR BIOLOGY
CO1	Understand the basis of genetic framework in living cells
CO2	Explore the molecular mechanisms for the synthesis of DNA and its repair mechanisms
CO3	Summarize the molecular mechanism of transcription
CO4	Demonstrate the synthesis of proteins by translation machinery
CO5	Assess the process of gene regulation by various molecular mechanisms

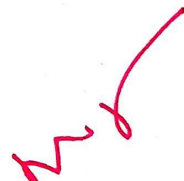
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PO,PSO CO	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	H	H	M	H	H	H	M	M	L	M
CO2	H	H	M	H	H	H	M	H	L	M
CO3	H	H	M	H	H	H	M	L	L	M
CO4	H	H	M	H	H	H	M	L	L	M
CO5	H	H	M	H	H	H	H	H	L	H

H-High; M-Medium; L-Low

18PBCM105	CORE V: CELLULAR BIOCHEMISTRY
CO1	Identify the ways by which the cells are organized
CO2	Recite the various components of cells involved in the functional association of them
CO3	Relate the role of signaling molecules in cell-cell interactions
CO4	Illustrate the significance of cell signaling pathways in cellular functions
CO5	Interpret the alterations in cellular interactions and their subsequent consequences

  
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CO1	H	M	L	M	H	H	L	L	H	M
CO2	H	M	L	M	H	H	H	L	L	M
CO3	H	M	L	M	H	H	H	H	L	M
CO4	H	M	L	M	H	H	H	H	L	M
CO5	H	M	L	M	H	H	H	H	H	H

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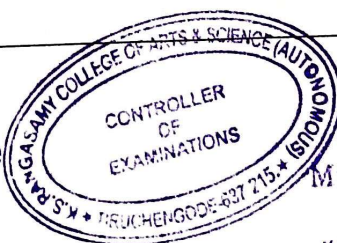
18PBCMP101	CORE PRACTICAL I: ANALYTICAL BIOCHEMISTRY AND MOLECULAR BIOLOGY
CO1	Implicate isolation and separation techniques
CO2	Extract and purify the enzymes
CO3	Determine the factors affecting the rate of enzyme catalyzed reaction
CO4	Perform enzyme immobilization techniques
CO5	Apply the techniques of isolation and quantification of DNA


18PBCM201	CORE VI: INTERMEDIARY METABOLISM AND REGULATION
CO1	Describe the mechanism of working of various energy transfer reactions in living system.
CO2	Correlate the pathways of carbohydrate metabolism
CO3	Explain the synthesis and utilization of lipid molecules in living organism
CO4	Figure out the anabolic and catabolic reactions of amino acids
CO5	Illustrate the synthesis of nucleotides and its regulation

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

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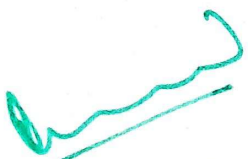
  
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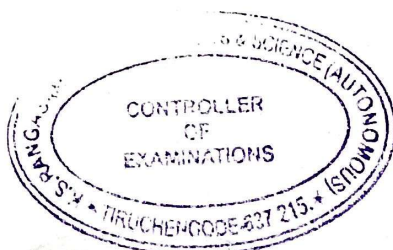
18PBCM202	CORE VII: PLANT BIOCHEMISTRY
CO1	Explain the basic concepts in photosynthesis
CO2	Evaluate the impact of enzymes and hormones in plant growth and maintenance.
CO3	Describe the stages of biochemical events that occur in plants.
CO4	Analyze the various synthetic mechanisms and the role of several plant metabolites.
CO5	Explore the use of various techniques for the production of superior plants with improved qualities.


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

H-High; M-Medium; L-Low

18PBCEL201	ELECTIVE I: RECOMBINANT DNA TECHNOLOGY
CO1	Apply the basic techniques in gene manipulation and various enzymes used in gene transfer
CO2	Explore the types, characteristic features and applications of cloning vectors
CO3	Pertain the recent advances in gene transfer and cloning strategies to produce a new product
CO4	Discriminate the significance and applications of expression vectors
CO5	Describe the importance of bioethics and IPR while carrying out research

  
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**MAPPING**

CO \ PO,PSO	MAPPING									
	PO1	PO 2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M	H	H	H	H	L	M	M	H	H
CO2	M	H	H	H	H	L	M	M	H	H
CO3	M	H	H	H	H	L	M	M	H	H
CO4	M	H	H	H	H	L	M	M	H	H
CO5	M	H	H	H	H	L	M	M	H	H

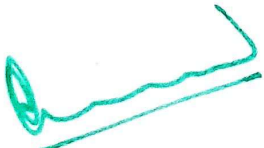
H-High; M-Medium; L-Low

18PBCEL202	ELECTIVE II: FOOD PROCESSING AND QUALITY CONTROL
CO1	Explain the concept of food processing
CO2	Employ the principles and methods of food preservation
CO3	Portray the various methods employed in food storage
CO4	Evaluate the food quality by using various techniques
CO5	Implicate the food laws and standards for safety production of food products and appraise themselves as a successful entrepreneur in the field of food technology

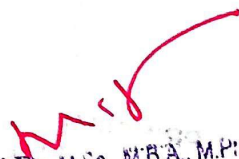
**MAPPING**

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

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<b>18PBCMP201</b>	<b>CORE PRACTICAL II: PLANT BIOCHEMISTRY</b>
<b>CO1</b>	Extract and quantify phytoconstituents
<b>CO2</b>	Perform plant tissue culture techniques
<b>CO3</b>	Apply DNA techniques in genetic recombination

<b>18PBCM301</b>	<b>CORE VIII: CLINICAL BIOCHEMISTRY</b>
<b>CO1</b>	Explain the basis for the onset of metabolic disorders.
<b>CO2</b>	Analyze the altered physiological profile in metabolic disorders like diabetes mellitus
<b>CO3</b>	Explore the functioning of kidney and liver and their biochemical changes in diseased condition
<b>CO4</b>	Pertain the enzyme and fluid analysis in diagnosis of diseases
<b>CO5</b>	Describe the role of free radicals and antioxidants in diseases


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

H-High; M-Medium; L-Low

<b>18PBCM302</b>	<b>CORE IX: BIostatISTICS AND RESEARCH METHODOLOGY</b>
<b>CO1</b>	Learn the importance of statistics and Understand the concepts of measures of central tendency and measures of dispersion
<b>CO2</b>	Gain knowledge on correlation and regression analyses
<b>CO3</b>	Test the research statements through ANOVA
<b>CO4</b>	Select the appropriate procedure for carrying out their research work
<b>CO5</b>	Understand the concepts in writing thesis, proposal and result interpretation

  
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CO1	H	H	M	H	H	L	L	L	H	H
CO2	H	H	M	H	H	L	L	L	H	H
CO3	H	H	M	H	H	L	L	L	H	H
CO4	H	H	M	H	H	L	M	M	H	H
CO5	H	H	M	H	H	L	M	M	H	H

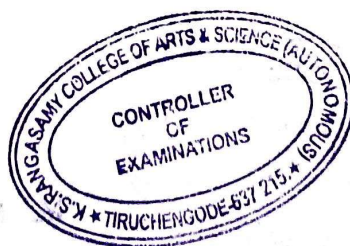
H-High; M-Medium; L-Low


18PBCEL301	ELECTIVE II: MOLECULAR IMMUNOLOGY AND IMMUNOTECHNOLOGY
CO1	Explain the fundamental ways by which the immune system protects the living organisms
CO2	Describe about the classification, properties and functions of processes that enable our immune system to respond to evolving threats
CO3	Appreciate the biochemical basis of hypersensitivity reactions
CO4	Illustrate the use of vaccination in prevention of diseases; mechanism of immunodeficiency and autoimmune diseases
CO5	Explore new, immunology-based disease diagnosis techniques and processes

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

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<b>18PBCEL302</b>	<b>ELECTIVE II: MOLECULAR GENETICS</b>
<b>CO1</b>	Describe the chemical basis of heredity, human genome and its relationship to health and disease
<b>CO2</b>	Illustrate the patterns of inheritance
<b>CO3</b>	Pertain the genetic variations in the chromosomal structure and their aberrations
<b>CO4</b>	Appraise the evolutionary significance of Transposable elements
<b>CO5</b>	Improve the level of genetic literacy about the behavioral and evolutionary genetic analysis

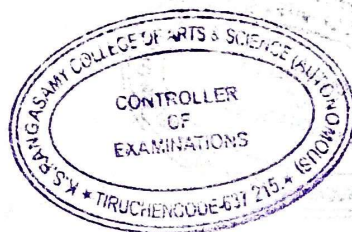
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CO1	H	M	L	M	M	L	M	M	H	H
CO2	H	M	L	M	M	L	M	M	H	H
CO3	H	M	L	M	M	L	M	M	H	H
CO4	H	M	L	M	M	L	M	M	H	H
CO5	H	M	L	M	M	L	M	M	H	H


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<b>18PBCMP301</b>	<b>CORE PRACTICAL III: CLINICAL BIOCHEMISTRY</b>
<b>CO1</b>	Understand the principle and procedure in the determination of clinically important biomarkers in diagnosis of diseases
<b>CO2</b>	gain sound knowledge about basic immunotechniques

<b>18PBCM401</b>	<b>CORE X: HUMAN PHYSIOLOGY AND NEUROSCIENCE</b>
<b>CO1</b>	Clarify the physiological role of cardiovascular system and diffusion and transport of gases among various tissues
<b>CO2</b>	Interpret the basic framework of nervous system and the working of sensory responses
<b>CO3</b>	Infer the biochemical aspects of excretion and thermoregulation
<b>CO4</b>	Explain the structure and functions of brain and spinal cord
<b>CO5</b>	Demonstrate the causes and complications of degenerative disorders of nervous system

  
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CO1	H	M	L	M	M	M	M	H	M	M
CO2	H	M	L	M	M	M	M	H	M	M
CO3	H	M	L	M	M	M	M	H	M	M
CO4	H	M	L	M	M	M	M	H	M	M
CO5	H	M	L	M	M	M	M	H	M	M

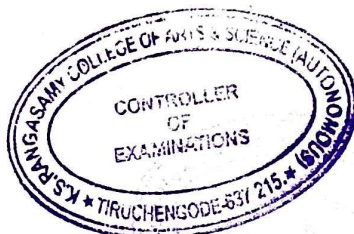
H-High; M-Medium; L-Low


<b>18PBCM402</b>	<b>CORE XI: HORMONAL BIOCHEMISTRY AND BIOCHEMICAL PHARMACOLOGY</b>
<b>CO1</b>	Describe the classification and mechanism of action of hormones
<b>CO2</b>	Illustrate the chemistry, synthesis and significance of peptide, thyroid and adrenal gland hormones
<b>CO3</b>	Analyze the significance of hormones in Spermatogenesis, pregnancy, parturition, lactation
<b>CO4</b>	Discriminate the classification and pharmacodynamics of drugs
<b>CO5</b>	Explore the new challenges in the development of efficient mediators to combat diseases and pharmacokinetics of drugs

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CO1	H	M	L	M	M	H	H	H	L	M
CO2	H	M	L	M	M	H	H	H	L	M
CO3	H	M	L	M	M	H	H	H	L	M
CO4	H	M	L	M	M	H	L	M	L	H
CO5	H	M	L	M	M	H	L	M	H	H

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<b>18PBCMBI201/ 18PBCBTI201</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 and methods in diagnosis of clinical disorders
<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,H	H,M	L,M	M,M	M,M	H,H	M,H	L,H	H,M	H,M
CO2	M,H	H,M	L,M	M,M	M,M	H,H	M,H	L,M	H,M	H,M
CO3	M,H	H,M	L,M	M,M	M,M	H,M	M,M	L,L	H,L	H,L
CO4	M,H	H,M	L,M	M,M	M,M	H,M	M,M	L,L	H,L	H,L
CO5	M,H	H,M	L,M	M,M	M,M	H,H	M,H	L,H	H,H	H,H

H-High; M-Medium; L-Low

<b>18PBCMBIP201/ 18PBCBTIP201</b>	<b>INTERDISCIPLINARY COURSE PRACTICAL I: DIAGNOSTIC BIOCHEMISTRY</b>
<b>CO1</b>	Perform blood cell analysis procedures
<b>CO2</b>	Estimate the presence of metabolites in blood and urine
<b>CO3</b>	Use the tests to identify normal and abnormal constituents in urine by qualitative analysis

<b>18PBCMBI301/ 18PBCBTI301</b>	<b>INTERDISCIPLINARY COURSE II: PHARMACEUTICAL BIOCHEMISTRY</b>
<b>CO1</b>	Describe the drug sources, classification and its pharmacodynamics
<b>CO2</b>	Explain the mechanisms of action and fate of drugs inside living organisms
<b>CO3</b>	Analyze the effects of adverse drug reactions
<b>CO4</b>	Appreciate the various medical systems that utilize phytoconstituents as medicines
<b>CO5</b>	Explore the new strategies in the development of efficient drugs to combat diseases from plants

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

H-High; M-Medium; L-Low

<b>18PBCMBIP301/ 18PBCBTIP301</b>	<b>INTERDISCIPLINARY COURSE PRACTICAL II:PHARMACEUTICAL BIOCHEMISTRY</b>
<b>CO1</b>	Extract and screen the presence of various plant metabolites
<b>CO2</b>	Quantify the presence of biomolecules and secondary metabolites in samples

  
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