DEPARTMENT OF BIOCHEMISTRY

Programme: B.Sc., Biochemistry

PO No.	Programme Outcomes Upon completion of theB.Sc. Degree Programme, the graduate will be able to
PO-1	emerge with competency in the subject of Biochemistry and apply knowledge to cater the needs of Society / Employer / Institution / Entrepreneur / Enterprise.
PO-2	imbibe analytical/critical/logical/innovative thinking skills in the field of Biochemistry.
PO-3	acquire distinct traits and ethics with high professionalism to gain a broader insight into the domain concerned for nation building.
PO-4	impart quality life sciences education to women students and to develop young women as outstanding scholars/teachers/entrepreneur/responsible persons especially in the field of Biochemistry and to understand the basics of life with their organization, mechanism of action, diseases and syndromes and their significance.
PO-5	develop capability to function as efficient leader and to encourage the teamwork for managing the projects effectively and economically.

PSO No.	Programme Specific Outcomes Upon completion of these courses the student would
PSO-1	acquire in – depth theoretical and practical knowledge of Biochemistry and to apply the skills to provide cost efficient solutions in Biochemistry.
PSO-2	compare and contrast the depth of scientific knowledge in the broad range of fields including Cancer biology, Diagnostic Biochemistry, Genetic Engineering, Molecular Biology and Hormonal Biochemistry.
PSO-3	enhance the academic and personal transferable skills and also to gain experience in the methodology of research and development in Biochemistry using modern equipments.
PSO-4	develop a mix of expertise by applying the knowledge of Biochemistry in dealing environmental, intellectual, social and ethical issues.
PSO-5	To transfer and empower the graduates to meet global challenges in research and careers in industry or in academic set up.

Course Title	BIOMOLECULES	
CODE	**18BCUC101**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Familiarize about the definition, occurrence, and types of various biomolecules.	K1 & K2
CO-2	Recall and understand the classification, chemistry and functions of macro and micro nutrients.	K1 & K2
CO-3	Imbibe and interpret the chemical reactions of monosaccharides, amino acids and structural organization of various biomolecules.	K2 & K3
CO-4	Evolve the physiological functions and significance of macro and micro nutrients.	K2 & K3
CO-5	Correlate the need of macro and micro nutrients with the metabolic and physiological functions of the human body.	K3

Course Title	CORE BIOCHEMISTRY PRACTICAL – I	
CODE	**18BCUCP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Learn and understand the principles of reactions involved in the qualitative analysis of carbohydrates and amino acids	K1
CO-2	Demonstrate the acid and iodine number of lipids	K2& K3
CO-3	Analyze, interpret and identify the unknown carbohydrates and amino acids	K2& K3

Course Title	BASICS OF BIOTECHNOLOGY - I	
CODE	18BCUA101	
CO No.	Course Outcomes	Knowledge Level
CO-1	Learn the basics of plant & animal tissue culture and assisted reproductive techniques in human.	K1
CO-2	Understand the requirements of plant and animal tissue culture and characterization of stem cells.	K2
CO-3	Illustrate and analyze the methods used in plant and animal tissue culture and assisted reproductive techniques in humans and stem cell characterization.	K2 & K3
CO-4	Interpret and select the preeminent technology tissue culturing of plant cells and artificial reproduction in humans.	K2 & K3
CO-5	Apply the tissue culture technology in various scientific cell level researches and stem cell therapy in medical field.	K3

Course Title	ALLIED PRACTICALS – I: BIOTECHNOLOGY	
CODE	18BCUAP01	
CO No.	Course Outcomes	Knowledge Level
CO-1	To ascertain the composition of microbial cell culture and plant tissue culture media , Handling of microscope and glassware of Plant tissue culture.	K1
CO-2	To demonstrate the Hanging drop technique, Biometric measurements of Organic plants, sterilization of materials required for microbial cell culture and plant tissue culture.	K2 & K3
CO-3	To isolate and analyze bacteria present in curd by Serial dilution and staining methods. To analyze and evaluate antibiotic sensitivity To isolate genomic DNA of plant and animal cell	K2 & K3

Course Title	ANALYTICAL TECHNIQUES	
CODE	**18BCUC202**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Apprehend the basics of instruments used in biochemical analysis and reagent preparation.	K1 & K2
CO-2	Cognize the principles of the various analytical instruments used in biochemistry research laboratories.	K2
CO-3	Explore the various separation and quantifying techniques used to isolate and measure the biological samples.	K3
CO-4	Compare and sort out the suitable techniques used for the analysis of biological samples chosen.	K2 & K3
CO-5	Solicit the analytical techniques in clinical, food and chemical industries.	K3

Course Title	CORE BIOCHEMISTRY PRACTICAL – II	
CODE	**18BCUCP02**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Imbibe the usage of paper chromatography, TLC, SDS- PAGE, colorimeter and spectrophotometer.	K1
CO-2	Comprehend the principles involved in the estimation of glucose, phosphorous, urea, uric acid, creatinine and protein.	K2
CO-3	Analyze and interpret the results of estimation of glucose, phosphorous, urea, uric acid, creatinine and protein.	K3

Course Title	ENZYMES AND ENZYME TECHNOLOGY	
CODE	18BCUC303	
CO No.	Course Outcomes	Knowledge Level
CO-1	Familiarize about introduction to enzymes, enzyme units, ribosomal, lysosomal enzymes, coenzymes, immobilized enzymes, biosensors.	K1 & K2
CO-2	Understand the classification of enzymes, Factors affecting enzyme action, structure of coenzymes, allosteric enzymes, applications of immobilized enzymes & artificial enzymes.	K1 & K2
CO-3	Analyse the theories proposed for active site, multi enzyme complex, enzyme inhibition, functions of coenzyme, enzymes in medical diagnosis.	K2 & K3
CO-4	Explore the extraction and purification of enzymes, enzyme kinetics, mechanism of action of lysozyme, methods of immobilized enzyme, biosensor techniques.	K1,K2& K3
CO-5	Elucidate the structure and kinetics of enzymes, functions of coenzyme, enzyme technology and enzyme biosensor.	K3

Course Title	CORE BIOCHEMISTRY PRACTICAL – III	
CODE	18BCUCP03	
CO No.	Course Outcomes	Knowledge Level
CO-1	Learn and understand the concepts of buffer,separation techniques of biomolecules.	K1
CO-2	Demonstrate marker enzyme by kit method	K2& K3
CO-3	Optimizethe enzyme activity in terms of pH , substrate,temperature,and enzyme concentration.	K2& K3

Course Title	INTERMEDIARY METABOLISM	
CODE	**18BCUC404**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Comprehend the significance, metabolism of Carbohydrates, Lipids, Proteins & Purines.	K1 & K2
CO-2	Learn the enzymes & reactions involved in metabolism of Carbohydrates, Lipids, Proteins & Purines.	K1 & K2
CO-3	Study various pathways of anabolism and catabolism of Carbohydrates, Lipids, Proteins & Purines.	K2 & K3
CO-4	Analyse the energetics of metabolic pathway, inter-relationship between the Carbohydrates, Lipids, Proteins & Purines, Electron transport chain and Oxidative phosphorylation.	K1,K2& K3
CO-5	Explicate the concept of metabolism and significance of pathways in metabolism.	K3

Course Title	ALLIED – II : MS OFFICE 2010	
CODE	19BCUA404	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquire basic skills on MS Word to create proper documents.	K1 & K2
CO-2	Customize the file management procedures using MS Word	K3
CO-3	Develop Excel spreadsheets for general office use	K2 & K3
CO-4	Develop effective presentations to communicate to the target audience	K2 & K3
CO-5	Acquire knowledge on internet basics	K3

Course Title	ALLIED PRACTICALS- II : MS OFFICE 2010	
CODE	19BCUAP02	
CO No.	Course Outcomes	Knowledge Level
CO-1	Acquire basic skills on shortcuts and keyboard techniques to enhance productivity .customize the file management procedures using MS Word.	K1
CO-2	Develop spreadsheets for general office use, effective presentations.	K2
CO-3	Apply internet to access various activity in our day today life.	K3

Course Title	CELL AND CANCER BIOLOGY	
CODE	18BCUC505	
CO No.	Course Outcomes	Knowledge Level
CO-1	Familiarize about introduction to cell theory, types of cells and their organization. Understand the differences between normal and cancer cells.	K1 & K2
CO-2	Understand the various cell organelles, their structure, morphology and functions & familiarize with the biochemical changes in the normal cells to become cancerous.	K1 & K2
CO-3	Analyze the concept ofchromosomal organization, cell cycle, mitosis, oncogenes and the applications of stem cells.	K2 & K3
CO-4	Explore the early detection of cancer cells and various cancer treatments.	K1,K2& K3
CO-5	Elucidate the role of Artificial Intelligence in cancer biology.	K3

Course Title	HUMAN PHYSIOLOGY WITH MEDICAL TERMINOLOGY	
CODE	**18BCUC506**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand the biochemical, molecular and cellular events that orchestrate the coordinated functioning of various organ systems of the human body that regulate life processes.	K2 &K3
CO-2	Familiarize the structureof digestive system and functions of enzymes involved in digestion of carbohydrates, proteins & fats and to understand the mechanism of exchange of gases between lungs & tissues.	K2&K3
CO-3	Summarize the functions of blood cells, processes of blood clotting and cardiac cycle.	K2 & K3
CO-4	Understand the mechanism of muscle contraction, urine formation and transmission of nerve impulses.	K2 & K3
CO-5	Comprehend the functions of reproduction organs and identify various disorders &diseases associated with malfunctioning of reproductive organs.	K2 & K3

Course Title	MOLECULAR BIOLOGY	
CODE	**18BCUC507**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquaint the basics of DNA replication & Protein synthesis and factors involved in these processes.	K1
CO-2	Discern the mechanism of Replication, Transcription, Translation and Gene expression.	K1 & K2
CO-3	Pursue the post transcription and translation modifications genetic code, genetic mutation and recombination.	K2 & K3
CO-4	Elucidate the mechanism of DNA repair, identification of gene mutation and regulation of gene expression.	K2 & K3
CO-5	Explicate the concept of DNA replication and protein synthesis, gene expression, recombination, mutation and repair.	K1, K2 &K3

Course Title	CLINICAL BIOCHEMISTRY	
CODE	**18BCUE501**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Acquaint the knowledge of components of Blood.	K1
CO-2	Understand the signs, symptoms and disorders of Carbohydrate,Lipid,Protein and Nucleic acid metabolism.	K2
CO-3	Analyze the variation in Biochemical parameters pertaining to Carbohydrate,Lipid,Protein and Nucleic acid metabolism.	K2
CO-4	Demonstrate and Interpret the Gastric,Pancreatic,Intestine,Kidney and Liver function tests.	K3
CO-5	Elucidate the etiology and Clinical screening of various metabolic disorders and Inborn errors of metabolism.	K1,K2,K3
Course Title	**PLANT BIOCHEMISTRY AND PLANT THERAPEUTICS**	
CODE	**18BCUE502**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Familiarize with the structure and function of cell and its organelles. Learn the relationship between plant cell and water.	K1
CO-2	Review the components and reactions of photosynthesis (Light reactions, Dark reactions and CAM pathway) and photorespiration.	K2
CO-3	Analyze the Nitrogen cycle and Nitrogen fixation. Investigate the role and mode of action of plant regulators.	K3
CO-4	Demonstrate the physiological events. Illustrate the role of biochemical events with photo periodism and phytochrome.	K2 & K3
CO-5	Perceive the role of secondary metabolites.	K1, K2& K3

Course Title	CORE BIOCHEMISTRY PRACTICAL IV	
CODE	**18BCUCP04**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Analyse and interpret the components of blood and urine	K1,K2
CO-2	Estimate the enzyme level in serum using colorimetry	K1,K2
CO-3	Evaluate the lipoprotein level in serum by kit method.	K1,K2,K3

Course Title	MEDICINAL CHEMISTRY	
CODE	**18BCUC608**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Familiarize with the terminology and definitions used in the study of drug action inside the body.	K1
CO-2	Perceives the knowledge of receptor function& types and classification, absorption, distribution, metabolism & elimination of drugs.	K1 &K2
CO-3	Explores the route of administration, dosage, drug interactions and efficacy of drugs used as therapeutic agents.	K2 & K3
CO-4	Depict the utilization of various drugs as agents of Antibacterial, Antiviral, Antimalarial, Anticancer and against systemic diseases.	K2 & K3
CO-5	Demystify the physiological, therapeutic and toxicological effect of chemical moieties used as drug. Expertise Drug discovery and Artificial Intelligence in drug development .	K1, K2& K3

Course Title	GENETIC ENGINEERING	
CODE	**18BCUC609**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Enumerate the basics gene cloning and restriction enzymes.	K1
CO-2	Visualize the basic features of vectors (pBR322, cosmid, pSV and retroviral vectors). Examine the general characteristics of the cloning hosts and construction of libraries.	K2
CO-3	Elaborate the transformation, selection and identification of recombinants. Demonstrate the blotting techniques and hybridization probes.	K3
CO-4	Analyze the concept of DNA sequencing.AssessDNA fingerprinting and foot printingtechniques.Investigate PCR withits application and construction of transgenic plants.	K2&K3
CO-5	Summarize the application of gene cloning technology. Depict the production of recombinant insulin and GH. Justify the safety aspects of genetic engineering.	K1, K2& K3

Course Title	IMMUNOLOGY AND IMMUNOTECHNIQUES	
CODE	**18BCUC610**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Inure the History of Immunology, Basics of Immunology and Structure & Functions of Lymphoid Organs.	K1
CO-2	Comprehend the cell structure, functions and interactions of Immuno responsive cells.	K1,K2
CO-3	Analyse the contribution of complement system, MHC and Vaccination in provoking Immunity.	K2,K3
CO-4	Explore the mechanisms instigating Hypersensitive reactions, Autoimmune disorders, Transplantation and Immuno suppression.	K3
CO-5	Expound and interpret the Antigen-Antibody interactions and their application in various Immuno techniques.	K2,K3

Course Title	HORMONAL BIOCHEMISTRY	
CODE	**18BCUC611**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Understand and appreciate the different cognate and non-cognate modes of communication between cells in a multi-cellular organism	K1 & K2
CO-2	Understand the role of endocrine system in maintaining ionic and glucose homeostasis	K1 & K2
CO-3	Should be able to describe molecular, biochemical and physiological effects of all hormones and factors on cells and tissues.	K2 & K3
CO-4	Understand the integrative communications that regulate, growth, appetite, metabolism and reproduction	K1,K2& K3
CO-5	Elucidate the role of hormones in biological clock	K3

Course Title	ELECTIVE DIAGNOSTIC BIOCHEMISTRY PRACTICAL	
CODE	**18BCUEP01**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Familiarize the basic requirements of clinical laboratory.	K1& K2
CO-2	Acquire basic knowledge in collecting and processing of biological specimens& Maintain accurate and legible records.	K2&K3
CO-3	Operate automated instruments to analyze biochemical parameters& Interpret the pathophysiology of prevalent disease	K2 & K3

Course Title	CORE BIOCHEMISTRY PRACTICAL - V	
CODE	**18BCUCP05**	
CO No.	**Course Outcomes**	**Knowledge Level**
CO-1	Perceive the analysis of Glucose and Protein in urine qualitatively.	K1
CO-2	Demonstrate the clinical experimentsto determine blood coagulation.	K2&K3
CO-3	Analyse and Interpret the experiments of Plant Biochemistry and Immunotechniques used in clinical laboratory.	K2 & K3