PROGRAM SPECIFIC OUTCOMES

BSc Biochemistry graduates will be able to:

PSO1 Correlate biochemistry with other branches of life sciences.

PSO 2 Exhibit specialized knowledge and competence in describing life processes.

PSO3 Apply the knowledge in industries and ableto work in field works also.

COURSE OUTCOMES

SEM I

PAPER 1- BIOMOLECULES & HUMAN PHYSIOLOGY

Course objectives: To give students a generalized idea about the basic aspects of biomolecules and its involvement in human physiology. This course offers interlinking phenomenon of biomolecules and human physiology so that students can be able develop research ideas to solve physiological related problems. Students will aware about how a complex mechanism of physiology governs by various macromolecules. Course provides practical approach and knowledge about various physiological aspects and biomolecules present in the body.

Course outcomes: On completion of the course students will be able to:

CO1: Describe the structure of carbohydrates with their diverse functions in cellular processes
CO2: Appriciate unique structural attributes and functional activities of lipids
CO3: Evaluate the functioning of muscle and digestive system
CO4: Comprehend and illustrate the architecture of plasma membrane and transport systems.

SEM I

PAPER 2- MICROBIOLOGY & VIROLOGY

Course objectives: This paper will give a generalized idea about various microbiological aspects to students. This course will offer a complete knowledge on microbial history, microscopes, staining, microbial growth, microbial classification etc.

Course outcomes: On completion of the course students will be able to:

CO1: Appreciate the historical discoveries in the field of microbiology and components of microscope for observation of microorganisms

CO2: Describe principles of various bacterial staining methods and identify key features of viruses

CO3: Appreciate distinguishing features of prokaryotes and eukaryotes with added knowledge about bacterial classification

CO4: Explain the growth requirements of bacteria

PAPER I- HUMAN PHYSIOLOGY

Course objectives: The objective of this course is to provide detailed knowledge to students about excretion, hematology, neurobiology, reproduction and endocrinology. This course offers complete mechanisms of action involved in the human physiology in order to maintain homeostasis of the body.

Course outcomes: On completion of the course students will be able to:

CO1: Discuss the structural and functional aspects of human excretory and reproductive systems

CO2: Describe blood composition and functional attributes of each blood component

CO3: Summarize and interpret neuronal function and communication

CO4: Justify the hormonal regulatory circuitry involved in regulating cellular functions

SEM II

PAPER II- MICROBIOLOGY & IMMUNOLOGY

Course objectives: This course offers the complete information related to microbial control and immunology. Students will able to correlate between pathological role of microorganism and defense mechanism via various cells and organelles. Practicals provide laboratory approaches to understand the basic mechanisms of antigen, antibody and microbial pathology.

Course outcomes: On completion of the course students will be able to:

CO1: Enlist nutritional requirements of microorganisms for growth

CO2: Compare and contrast the mechanism of action of different microbial control agents

CO3: Summarize the organization of immune system and structural features of immunoglobulin

CO4: Give an overview of classification and maturation of immune system

SEM III

PAPER I: MACROMOLECULES

Course objectives: To offer students, knowledge about the macromolecules like protein and nucleic acids. This course provides a better understanding to students about the complex structures and functions of proteins and nucleic acids along with their complete cellular and

biochemical aspects. This course allows students to develop research aptitudes required to link these macromolecules with other relevant topics or branches.

Course outcomes: On completion of the course students will be able to

CO1: Analyze the chemistry of amino acids found in proteins with features responsible for synthesis of proteins

CO2: Appreciate the structure function relationship of proteins with parameters involved in protein folding

CO3: Examine factors involved in structural dynamics of nucleic acids

CO4: Identify ways to examine structural features of different forms of nucleic acids

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SEM III

PAPER II: BIOPHYSICAL TECHNIQUES I

Course objectives: This course offers techniques required to understand biochemistry in different systems. Determination of macromolecules and other physiological molecules can be determined using these techniques. It allows students to measure and quantify different parameters. It provides strong base to students to enter in the field of research.

Course outcomes: On completion of the course students will be able to

CO1: Acquire knowledge about the concepts, principle, working, detection system and applications of spectrophotometers.

CO2: Compare various forms of spectrophotometers and develop a knowhow about the mechanism of action of buffer and their various types of equations.

CO3: Develop knowledge about fundamental principles of chromatography and possible extensions in the same.

CO4: Get a complete overview about some common chromatographic methods and their applications.

SEM IV

PAPER I: ENZYMOLOGY

Course objectives: The objective of this course is to have complete information about the fundamentals of enzymes. This course makes students familiar to basic concepts and mechanism of action through which various enzymes work. Course also provides knowledge about kinetics equations and derivations to the students. This course makes students more familiar to enzyme related research at industrial level.

Course outcomes: On completion of the course students will be able to

CO1: Recognize various terminologies used in enzymology and will get familiarized with various models required to explain enzyme substrate complex.

CO2: Describe the basic mechanisms of action of some specific enzymes with factors responsible for the same

CO3: Derive different mathematical equations required to explain enzymes activity through graphs (Ex LB plots) and what kind of inhibitors govern them.

CO4: Acquire knowledge about enzyme assay principles used after their purification.

PAPER II: BIOPHYSICAL & BIOCHEMICAL TECHNIQUES

Course objectives: This course offers techniques like electrophoresis, centrifugation and isotopic tracer required to understand biochemistry in all kind of living cells. This course allows students to become familiar with isolation, identification and characterization of biochemical compounds. This course offers information about various immunological techniques required to link biochemistry and immunology. In addition, this course also offers knowledge about isotopic tracer techniques required to develop modern and upgraded research aptitude in students.

Course outcomes: On completion of the course students will be able to

CO1: Demonstrate an understanding of the principles and techniques of gel electrophoresis, including the different types of gels, solubilizers, and the procedure for running electrophoresis with its applications.

CO2: Identify the various specialised technical attributes of gel elctrophoresis and immunological techniques.

CO3: Identify the advantages and applications of isotopes for studies associated with biomolecules

CO4: Derive and recognize the mathematical principles underlying the sedimentation process for applications in biomolecular characterization

PAPER I: METABOLISM I

Course objectives: The main objective of this course is to offer complete and detailed knowledge about metabolic processes and mechanisms; through bioenergetics, metabolic techniques and glucose oxidation. This course gives an example of carbohydrate to explain metabolism to students at very basic and deep level with the complete physiology of mitochondria and electron transport chain. This course provides a strong research base to students to understand biochemistry in metabolic diseases through good and innovative practical approaches.

Course outcomes: On completion of the course students will be able to

CO1: Recognize and appreciate the importance of bioenergetics principles governing the progress of biochemical reactions
CO2: Demonstrate the knowledge of techniques used for performing metabolic studies
CO3: Enlist and explain the steps involved in metabolic progression of simple sugars.
CO4: Identify and describe the mechanisms involved metabolism of complex carbohydrates along with metabolic energy output

PAPER II: MOLECULAR BIOLOGY

Course objectives: The main objective of this course is to provide a detailed knowledge to students regarding very basic concepts of molecular biology i.e replications and transcription in prokaryotes. This course makes the basic concepts clear to students so that they can apply this knowledge in molecular biology research and acquiring complete insights on the fundamentals of genetics. Relavant practicals suitable to topic make students more familiar with replication and transcription.

Course outcomes: On completion of the course students will be able to

CO1: Recognize and appreciate the basic features of replication, semi conservative replicationwith experimental evidence and different models of replication.

CO2: Demonstrate the knowledge of regulatory aspects of replication along with DNA damage and repair mechanisms

CO3: Descriptive explanation of mechanism of RNA synthesis and factors involved in it.

CO4: Identify regulation of gene expression in prokaryotes through mechanisms of Lac Operon & Trp operon with viral reverse transcription as a mode of inheritance.

PAPER I: METABOLISM II

Course objectives: This course provides a detailed knowledge about the metabolism of complex macromolecules like lipids, proteins and nucleic acids. Also, it gives a complete account on mechanism of their metabolism, energy generation and utilization. Along with this students aware about the metabolic disturbances, resulting in diseases. This course not only explains the involvement of Biochemistry in metabolism but also the various interlinked pathways. To train students in metabolic research is also the aim of this course. Relevant practicals mentioned in the course offer fundamental understanding about the topics.

Course outcomes: On completion of the course students will be able to

CO1: Recognize and explain lipid metabolism as an alternative route of energy harnessing in absence of carbohydrates through mechanisms such as Beta oxidation an HMP shunt.

CO2: Identify and describe lipid biosynthetic pathways as routes for synthesis of storage and structural lipids.

CO3: Explain the principles of amino acid metabolism and detoxification strategies employed for removal of ammonia generated therein.

CO4: Discuss the intricacies associated with nucleic acid metabolism and diseases associated with it.

PAPER II: MOLECULAR BIOLOGY & rDNA TECHNOLOGY

Course objectives: The main aim of this course is to offer a scientific technological approach towards the applications of molecular biology and rDNA technology in the field of biological sciences using fundamental principles of biochemistry. This course offers complete information about the genetic code, decoding system, the process of translation, restriction enzymes, vectors, CDNA and genomic DNA required to build a scientific temperament in students. This course fills the gap between the student knowledge and the industries demands. However, topic related practicals mentioned in the course allow students to know subject more scientifically.

Course outcomes: On completion of the course students will be able to

CO1: Comprehend and recognize the features of the genetic code and wobble hypothesis.

CO2: Demonstrate the knowledge of aspects associated with the protein translation system and its regulation

CO3: Recognize and discuss the requirements for performance of basic rDNA technology

CO4: Appricieate and explain the methods utilized for execution of complete rDNA synthesis and

cloning pathway