

Department : Biochemistry

Programme outcomes: B.Sc Biochemistry

Students who have completed a degree in Biochemistry should be able to

PO1. After completion of the program the students are well poised to pursue careers in academic and industry in the areas of pharmaceutical and biotechnology.

PO2. Facilitate placement in various clinical laboratories, biological research institutes, hospital and community services.

PO3. Procuring hands on real time experience in industries

PO4. Implementation of practical laboratory skills and strong speculative foundation in the cross over discipline of Chemistry, Microbiology & Bioinformatics.

PO5. Applications of Biochemistry in various fields such as Clinical Biochemistry, Genetic Engineering, Molecular biology & Biotechnology.

Programme specific outcomes

UG Graduates of the degree will have the capacity to:

PSO1. Biochemists explore the chemical structure of living matter and the chemical reactions occurring in living cells.

PSO2. The students will be able to demonstrate an understanding of fundamental biochemical principles such as the structure and functions of biomolecules and metabolic pathways.

PSO3. The students will be able to demonstrate the structure and functions of various organs of human body.

PSO4. The students will be able to demonstrate practical skills in handling biological specimens, analysis and their safe disposal.

PSO5. Ability to relate various interrelated physiological and metabolic events.

Course Outcomes

Class	Course Code	Outcomes
I B.Sc	CO1	Understand the chemistry of water. Describe the chemistry of carbohydrates, lipids, proteins and nucleic acids Describe the catabolic reactions of carbohydrates, lipids and amino acids
	CO2	The fundamental properties of atoms, molecules, and the various states of matter with an emphasis on the particulate nature of matter. fundamental atomic structure and the periodicity of elements in the periodic table. simple quantum mechanical treatments of atoms and molecules
	CO3	Master core concepts and methods from ecological and physical sciences and their application in environmental problem solving. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
	CO4	Explain the structure and properties of carbohydrates. Describe the reducing action of sugars. Classify lipids with examples. Combine the structure and functions of lipids. Define saponification number, acid number and iodine number of fats. Identify the structure of amino acids. Classify proteins with functions.
II B.Sc	CO5	The student will integrate knowledge with critical thinking to solve problems. The student will perform qualitative/quantitative chemical analyses/syntheses using modern instrumentation. The student will articulate scientific information through written communication.
	CO6	This fundamental paper discusses the importance of microorganisms . The course throws light on types of microorganisms in and around humans .At the end of the course, the student has understanding on the metabolism and mechanism of microbial life
	CO7	Deduce hydrogen deficiency from a molecular formula and use this information to help deduce a structure 10. Be able to follow a detailed experimental procedure and construct a flow diagram to illustrate it. Depict and explain detailed chemical mechanisms for all laboratory reactions..

III B.Sc	CO8	Understand the basics of enzymes. Describe the nomenclature and classification of enzymes. Describe the mechanism of enzyme action and factors affecting it. Identify the enzyme kinetics. Understand the downstream processing of enzymes. Identify the commercial applications of enzymes
	CO9	Students will be taught Mendelian genetics, their principles and gene interaction. They learn about chromosomal aberrations and structure of chromosomes. The student will gain a basic understanding on human genetics and hereditary.
	CO10	This course gives an overview on the immune system including organs, cells and receptors. The students learn about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions. The course develops in the student an appreciation for principles of immunology
	CO11	Biotechnology in an historical perspective. Scope and Importance of Biotechnology. Familiarization of the terms associated with plant tissue culture. Felt applications in the different domains of biotechnology. The concept of recombinant DNA technology.
	CO12	Explain the anatomy, physiology and functions of various Tissues and cell, organization of cellular system. Classify different types of tissue and explain anatomy and physiology of skeletal system and joints. Explain the anatomy and Physiology of cardiovascular and respiratory system and its disorders.
	CO13	Operate and maintain laboratory equipment, utilizing appropriate quality control and safety procedures. American Society for Clinical Laboratory Science, the Recognize and participate in activities which will provide current knowledge and upgrading of skills in laboratory medicine.
	CO14	Discuss the fundamental biochemistry knowledge related to health. Explain the clinical significance of the laboratory tests. Diagnosis of clinical disorders by estimating biomarkers. Determine various substances including substrates, enzymes, hormones.

Programme outcomes: M.Sc. Biochemistry

Students who have completed a degree in biochemistry should be able to:

PO1. After completion of the program the students are well poised to pursue careers in academic, research and in pharmaceutical and biotechnological industries.

PO2. To demonstrate skills in clinical Biochemistry in order to diagnose various diseases.

PO3. Acquire necessary knowledge and skills to undertake a career in research, either in industry or in an academic set up.

PO4. Enhancing student's skills & employability through academic, research and internship opportunities

Programme specific outcomes

PG Graduates of the degree will have the capacity to:

PSO1: Compare and contrast the breadth and depth of scientific knowledge in the broad range of fields including Cell biology, Intermediary metabolism, Diagnostic Biochemistry, Pharmaceutical and Hormonal Biochemistry, Genetics, Nutritional Biochemistry, Immunology, Enzymology, Genetic engineering and Neurochemistry.

PSO2: Exposure to basic research through the provision of PG research based project.

PSO3: Developments of analytical and Cognitive skills in Biochemistry that allow independent exploration of biological science through research methods.

PSO4: Acquiring an appreciation of impact of life science on society.

PSO5: Analysis & interpretation of investigative data in life science.

PSO6: Students will be able to demonstrate the synthesis and degradation of biomolecules along with their regulation at transcriptional, translational and post-translational levels.

PSO7: Students will be able to search, read, and understand the applicable primary literature.

PSO8: Perfect gain insight into biochemical research ethics for production of quality research and publication.

Course Outcomes

Class	Course Code	Outcomes
I M.Sc	CO1	The relationship between molecular structure and function. the dynamic character of cellular organelles. the use of chemical energy in running cellular activities. ensuring accurate macromolecular biosynthesis. unity and diversity at the macromolecular and cellular levels and the relationship to adaptation through time. homeostatic mechanisms that regulate cellular activity.
	CO2	Easily understand the basic concepts/functions of solutes, chemical bonding and organic compounds. Describe the classification of biomolecules. Describe the basic reaction types and mechanisms of bio molecules. Understand the structures and functions of biomolecules. Analyse and study the chemical and biochemical properties of bio molecules.
	CO3	Develop skill in the preparation and sterilization of microbial medias. Demonstrates proficiency and use of following isolation of cultures by various methods. Perform Slab culture technique for enabling long term storage of culture medias. Identify different types of microbes by various staining techniques.
	CO4	Explain and perform Spore and capsule staining techniques. Know the different types of Fungal staining. Perform Antibody sensitivity disc-phenol coefficient method. Understand and estimate the growth kinetics curve of bacteria. Ability to utilize microbiological concepts to summarize, analyse and develop results in study of microorganisms.
	CO5	Choose appropriate strategies and instrumentation for analysis of different biological sample types. Through an understanding of the working principles of these instruments and the underlying biochemical basis. Conduct biochemical analyses and instrument evaluations in the laboratory and link the practical applications to the theoretical background.

II M.Sc	CO6	Understand the Basic concepts and principles of Clinical Biochemistry, detail on the various biological specimens including the process of collection, preservation and storage. Gain Knowledge on the collection, and analysis of Amniotic fluid and on the Immunological tests related to diagnosis of anomalies during pregnancy.
	CO7	Discuss the classification of immunity, cell mediated immune response, humoral immune response. Explain the structure, types of antigens and antibodies. Explain active and passive immunity Elaborate the method of monoclonal antibodies synthesize and various theories adopted for production of antibody
	CO8	Understand the basic terminologies of hormones, classification of hormones based on its chemistry. Deduce the structure of amino acid derived, protein and steroid hormones. Understand the synthesis of various hormones by respective gland.
	CO9	Distinguish the fundamentals of enzyme properties, nomenclatures, characteristics and mechanisms. Discuss the factors affecting enzymatic reactions. Describe the concepts of co-operative behaviour, enzyme inhibition and allosteric regulation.
	CO10	Discuss the overall concept of cellular metabolism – anabolic and catabolic pathways, energy storage and release, production of building blocks for macromolecule synthesis. Differentiate how various organs control metabolism. Discuss the basics of enzymes, transporters.
	CO11	Understand the pathophysiological processes responsible for common biochemical disorders such as jaundice, Pancreatitis, Fatty liver etc. Differentiate three types of jaundice and their systematic analysis. Detailed study of Jaundice, Cirrhosis, Hepatitis,

Programme outcomes: M.Phil Biochemistry

Students who have completed a degree in biochemistry should be able to

PO1. After completing the degree course they have an academic career, and then one can either find Academic jobs at various universities and institutes or do research.

PO2. To demonstrate skills in clinical Biochemistry in order to diagnose various diseases.

PO3. The M.Phil. Degree can act as a stand-alone degree for applicants who would like to gain experience in a specific area or can be linked to a Ph.D. program

PO4. The students can find jobs in Multi-National Companies dealing in Pharmaceuticals, Research, and Development, Agriculture, Microbial Technology, Enzyme Technology, Vaccinology, Immunology, Food Industries/Technology.

PO5. Job opportunities for M.Phil biochemistry are Assistant Research Scientist, Senior Research Fellow, Technical Specialist Genetics and Specialist Biochemistry

Programme specific outcomes

M.Phil Graduates of the degree will have the capacity to:

PSO1. Students will be able to demonstrate skills to handle biochemical and molecular techniques to plan and carry out experiments.

PSO2. Students will be able to demonstrate skills in analyzing data, testing of hypotheses using statistical software's and arrive at conclusions drawn from experimental data.

PSO3. Biochemistry aims to explore and understand every aspect of the structure and function of living things.

PSO4. A biochemical approach forms the basis for understanding the function and properties of molecules, cells, tissues, and whole organisms, under normal and abnormal conditions and in response to their changing environment.

PSO5. The synthesis of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways along with their regulation at the epigenetic, transcriptional, translational, and post-translational levels including RNA and protein folding, modification, and degradation.

PSO6. Designed and carried out a research project.

PSO7. Testing of hypotheses using statistical software's and arrive at conclusions drawn from experimental data.

Course Outcomes

Class	Course Code	Outcomes
M.Phil	CO1	Students will undertake original and publishable research studies with faculty mentors. they will demonstrate skill in relevant literature analysis, experimental design, actual use of experimental techniques. written communication of conclusions and their defines.
	CO2	Employ current and emerging technologies for the discovery, research, and development of biotechnology processes and products. Explore data sets from a variety of angles to determine hidden weaknesses, trends, and/or opportunities Critically Display knowledge of risk management, accurate record keeping.
	CO3	Understand the pathophysiological processes responsible for common biochemical disorders such as jaundice, Pancreatitis, Fatty liver etc. Differentiate three types of jaundice and their systematic analysis. Detailed study of Jaundice, Cirrhosis, Hepatitis, Fatty liver and gall stones. Serum enzyme activities in diseases.