

Course Outcomes of BSc Biochemistry

Semester I

BC1141: Core Course- I

Course Title – Perspectives, Methodology and Biomolecules-I

Course outcome: Student will be able to

1. Elicit the concepts of science
2. Describe the evolution and scope of biochemistry as a science discipline.
3. List out the different experimental approaches to study biochemical processes.
4. Prepare solutions of different concentration and pH.
5. Classify and characterize carbohydrates and lipids.

Semester II

BC 1221: Foundation Course-II

Course Title: Biomolecules-II and Bioinformatics

Course outcome: Student will be able to

1. Elaborate the composition of proteins and their function.
2. Detail the importance of genetic information carrier molecules in life.
3. Recognize the scope and application of Bioinformatics.
4. Perform statistical investigations related to biochemical problems.
5. Identify application of information technology in biology.

Semester III

BC1341: Core Course-II

Course Title: Cellular Biochemistry

Course outcome: Student will be able to

1. List out cell organelles and describe their structure and function.
2. Elaborate the different types of transport systems across cell membrane.
3. Explain types of cell division
4. Outline the characteristics of cancer cells and mechanisms involved in cancer biology.
5. Detail on the mechanism of interaction between cell and its environment.
6. Classify enzymes; describe types of enzyme inhibition and regulation.

Semester IV

BC 1441: Core Course- III

Course Title: Techniques in Biochemistry

Course outcome: Student will be able to

1. Explain the principle, working and application of different microscopic, photometric chromatographic, electrophoretic, centrifugation and radioactive techniques.
2. Select most suitable technique for the isolation and purification of biomolecules based on different criteria.

BC 1442: Core course- IV- Practical**Course Title: Qualitative Analysis of Biomolecules**

Course outcome: Student will be able to

1. Qualitatively analyse the type of biomolecule.
2. Identify the subclass of each biomolecule by schematic analysis

Semester V**BC 1541: Core Course -V****Course Title: Physiology & Immunology**

Course outcome: Student will be able to

1. Explain hemopoiesis and biochemical basis of blood group classification.
2. Elaborate on the transport of gases, acid base and water balance in the body.
3. Remember structure of muscle, neuron and bone.
4. Classify hormones and explain the functions of hormones.
5. Describe various aspects in basic immunology
6. Identify the applications of various techniques involved in immunology.

BC 1542 : Core Course VI**Course Title: Bioenergetics and Carbohydrate metabolism**

Course outcome: Student will be able to

1. Describe the bioenergetics of metabolic pathways.
2. Elaborate the reactions and regulation involved in the metabolism of carbohydrates.
3. List out the inborn errors of carbohydrate metabolism.
4. Enumerate the link between ETC and energy production in plant and animal cells.
5. Elicit the mechanism of energy production in carbohydrate metabolism.

BC 1543: Core Course-VII**Course Title: Food Science**

Course outcome: Student will be able to

1. Elaborate on the importance of human nutrition.
2. Describe the chemical composition of different types of food.
3. Explain the various food preservation techniques employed.
4. Identify the common adulterants in food.
5. Gain knowledge about the role of microorganisms in food and nutrition
6. Explain the importance of food safety and management systems.

BC 1544: Core Course-VIII**Course Title: Classical and Molecular Genetics**

Course outcome: Student will be able to

1. Give an account of Mendelian and non- Mendelian genetics.
2. Predict the type of inheritance of a trait/disease using pedigree analysis.
3. Explain the organization of chromatin and events during gene expression.
4. Illustrate the consequences of different types of mutations and DNA-repair systems

1. Depict the concepts of gene regulation in prokaryotic cells
2. Describe the methods involved in rDNA technology.
3. Provide insight into the molecular and cell-based methods used in the field of biology
4. Understand several modern molecular methods to elucidate molecular and genetic questions

BC 1545: Core Course – IX -Practical

Course Title: Quantitative Analysis of Biomolecules

Course outcome: Student will be able to quantitatively analyze different biomolecules in a given test sample.

BC 1551.2: Open Course

Course Title: Lifestyle Diseases

CO 01 student will be able to understand different lifestyle diseases

CO 02 student will be able to create general awareness associated with lifestyle diseases

CO 03 student will be able to create general awareness associated with prevention and management of lifestyle diseases

Semester VI

BC 1641: Core Course-X

Course Title: Clinical Biochemistry

CO 01 student will be able to understand the laboratory management and laboratory safety

CO 02 student will be able to understand the clinical application of biochemistry

CO 03 student will be able to understand microbiology

CO 04 student will be able to understand pharmacology.

CO 05 Able to list out the methods of clinical laboratory management and laboratory safety.

BC 1642: Core Course-XI

Course Title: Metabolism-II

Course outcome: Student will be able

CO 01 To understand various pathways in lipid metabolism

CO 02 To understand the synthesis and degradation of nucleotides

CO 03 To understand nitrogen cycle and biological nitrogen fixation

CO 04 To understand general reactions and disorders in amino acid metabolism

CO 05 To understand heme metabolism and detoxification process in liver

BC 1643: Core Course-XII - Practical**Course Title: Clinical Biochemistry and Enzymology**

Course outcome: Student will be able to

1. Quantitatively analyze parameters of clinical significance in blood and urine.
2. Detect the presence of abnormal constituents in the urine sample.

BC 1644: Core Course-XIII- Practical**Course Title: Food Analysis**

Course outcome: Student will be able to

1. Quantitatively estimate the specific biomolecule in any given food sample.
2. Detect the presence of adulterants in different food samples.

BC 1661.1: Elective Course**Course Title: Analytical Biochemistry**

Course outcome: Student will be able to **CO 01:** To understand the analysis of phytochemicals

CO 02: To understand the importance and impact of pesticides in life

CO 03: To understand food adulteration analysis

CO 04: To understand standards for respective category of water

CO 05: To understand the effect of toxic metals in foods and Analyze toxicants in biological

MSc Biochemistry

SEMESTER – I**ADVANCED TECHNIQUES IN BIOCHEMISTRY**

Course Code: BC 512

COURSE OUTCOME

Course outcome: Students can able to,

1. To understanding about the principle, applications and basic operational procedures of essential laboratory equipment like bright field and fluorescence microscopy, centrifugation and electrophoresis
2. To understanding of various chromatographic techniques and its application in the isolation of nucleic acids, proteins, sugars and other bio molecules
3. To understanding about the principle and application of immunological techniques
4. To Understand the different processes employed in tissue histopathologic analysis
5. To Understand the techniques like PCR and analysed to understand the source of biological samples.

PHYSIOLOGY

Course Code: BC 512

Course outcome: Students can able to,

1. To Understand the digestion and absorption of macro and micro nutrients of food.
2. To Understand blood components and how gaseous exchange occur in lungs, respiratory adaptation and the role of hemoglobin.
3. To Understand the structure, muscle proteins and molecular events of muscle contraction.
4. To Understand the neuron and synapse transmit nerve impulses and path to brain.
5. To Understand the role of kidney in urine formation and detoxification mechanism occurring in the liver.

PLANT AND MICROBIAL BIOCHEMISTRY

Course Code: BC 513

Course outcome: Students can able to,

1. To Understand the importance and processes of photosynthesis, photorespiration and electron transport chain in plants.
2. To Understand the value of secondary metabolites produced in plants.
3. To Understand the mechanism of plant resistance and the role of plant hormones and how these regulate plant functions.
4. To Understand the different groups of microbes, their nutritional requirement and genetic aspects.
5. To apply the theoretical knowledge on various microbial techniques to practical purpose and apply the knowledge in microbial nutrition for the culturing of microbes in laboratory.

PRACTICAL I: BIOCHEMICAL AND MICROBIAL TECHNIQUES

Course Code: BC 514

Course outcome:: Students can able to familiarize the basic techniques and instrumentation for various biochemical analysis and to provide hands own training in basic techniques of microbiology and microbial biochemistry

SEMESTER – II

ENZYMES

Course Code: BC 521

Course outcome: Students can able to,

1. To understand the nomenclature and classification of enzymes and coenzymes
1. To understand the catalytic mechanism of a given reaction type
1. To understand the enzyme kinetics for laboratory and research purpose
1. To understand the isolation and purification of enzymes for practical purpose
1. To understand the major applications of enzymes in industry and medicine

METABOLISM

Course Code: BC 522

Course outcome: Students can able to,

1. To understand the metabolism of carbohydrates & lipids
1. To understand the important biochemical steps in the metabolism of amino acids and nucleic acids
1. To understand the structure of mitochondria and how energy production occur in the organelle
1. To understand the role of oxidative phosphorylation in bioenergetics and ATP generation

CLINICAL BIOCHEMISTRY

Course Code: BC 523

Course outcome: Students can able to

1. To understand the biological sample collection and its interpretation.
2. To understand the automation in the clinical laboratory.
3. To understand the importance of enzymes in diagnosis of diseases.
4. To Understand the etiology of diseases that occur due to improper digestion and absorption of foods.
5. To understand the clinical knowledge on physiological organs and its related disorders.

CELL BIOLOGY AND GENETICS

Course Code: BC 524

Course outcome: Students can able to

1. To understand the Characterize structure, function and models of plasma membrane.
2. To understand the major stages of important cellular processes like cell cycle and apoptosis
3. To understand the cell-cell interactions and molecular players involved.
4. To understand the protein sorting and roles played by vesicles, lysosomes, Golgi apparatus and endoplasmic reticulum
5. To understand the the nature of inheritance, genetic testing and genetic counseling, linkage and genetic mapping, population genetic

PRACTICAL II: ENZYMOLOGY AND CLINICAL BIOCHEMISTRY

Course Code: BC 525

Course outcome: Students can able to

This lab course helps students to diagnose various derangements in metabolism/organ function. To practice the optimization of conditions for enzymes isolation, assay and its kinetics

SEMESTER – III

MOLECULAR BIOLOGY

Course Code: BC 531

Course outcome: Students can able to

1. To understand the cellular processes like DNA synthesis, RNA synthesis and protein synthesis and how they relate to each other,

1. To understand the Central dogma of molecular biology and its importance,
2. To understand the gene expression and how a stimulus can affect the expression of a gene & different regulatory mechanisms of gene expression.
3. To understand the RNA functions as genetic material in some organisms.
4. To understand the how misfolded proteins cause diseases in the body & the applications of molecular biology in the modern world

IMMUNOLOGY

Course Code: BC 532

Course outcome: Students can able to,

1. To Understand the basics of immune system and the various cells and organs involved
2. To Understand the concept of antigen-antibody interaction and their molecular aspects.
3. To Understand the role of B-lymphocytes & T-lymphocytes at the molecular level.
4. To Understand the serological reactions used in the diagnostic laboratory to detect interactions between antigens and antibodies.
5. To Understand the reasons for vaccination, immunization and immunotherapy.

PHARMACOLOGY AND TOXICOLOGY

Course Code: BC 533

Course outcome: Students can able to,

1. To Understand a drug and to know its nature, classification, dose-response and how to design/develop drugs.
2. To Understand various drug targets like receptors, enzymes, hormones etc and drug-receptor interaction with theories.
3. To Understand what drug does to the body by drug-protein interactions.
4. To Understand the concept of pharmacogenomics and its applications.
5. To Understand the diverse modes of drug action of common diseases.

METHODS IN RESEARCH

Course Code: BC 534

Course outcome: Students can able to,

1. To Understand the purpose and scope of research methodology
2. To understanding on various kinds of research, objectives of doing research, research process, research designs, sampling and to explore research methodology seen in literature.
3. To Understand a research design and identify different methods to conduct a research project.
4. To Understand analytical skills and awareness on various aspects of research in biochemistry.
5. To Understand statistical techniques used in data analysis.

1. To Understand the ethics in research involving human samples, embryo and stem cell research and to identify plagiarism and data fabrication

PRACTICAL III: IMMUNOTECHNIQUES AND PHYTOCHEMICAL ANALYSIS

Course Code: BC 535

Course outcome:

The course provides detailed protocols, experimental design and application-oriented training of the routine techniques in immunology and phytochemistry. Emphasis is given in encouraging self-exploration and analytical thinking in approaching biological samples of investigation and data derivation

SEMESTER – IV

MOLECULAR ENDOCRINOLOGY

Course Code: BC 541

Students can able

1. To Understand the endocrine system and its mode of operation
2. To Understand the response of endocrine organs to environmental changes
3. To understanding about the role of hormone receptors in hormone action
4. To Understand the mechanism of action of hypothalamus, pituitary, thyroid, pancreatic, adrenal, gastrointestinal hormones
5. To Understand the pathophysiological processes associated with hormone imbalance

BIOTECHNOLOGY AND GENETIC ENGINEERING

Course Code: BC 542

Students can able

1. To Understand basic idea about recombinant DNA (rDNA) technology, tools and the steps in involved in the process.
2. To Understand the knowledge on the requirements, steps and applications of gene cloning.
3. To Understand the basis of gene mapping and its usage.
4. To Understand the importance of genetically modified organisms.
5. To Understand the various applications of biotechnology and genetic engineering

PRACTICAL IV: TECHNIQUES IN MOLECULAR BIOLOGY

OBJECTIVE: This lab helps students to provide hands own training in different techniques used in Molecular Biology

DISSERTATION

Course Code: BC 544

OBJECTIVE: The primary objective of a dissertation work is to act as an introduction to biological research and its various aspects. Students shall carry out a research project specific to individual laboratory of the supervision teacher they are assigned with.