

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited to NAAC with “A+” Grade (4th Cycle)

College of Excellence (UGC)

Coimbatore – 641 029.

DEPARTMENT OF BIOCHEMISTRY (PG)

COURSE OUTCOMES (CO) OF

M.Sc., BIOCHEMISTRY

For the students admitted in the year


2024-2025

Programme Code: 07		Programme Title: M.Sc Biochemistry	
Title of the paper: Core Paper 1 – Biomolecules and Biopolymers			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To learn about the chemistry and structures of Biomolecules
2. To know the properties of different Biomolecules
3. To know the physiological functions of Biomolecules

Course Outcomes (CO)


K1  K5	CO1	Correlate the classification and functions of Biomolecules in energy Production.
	CO2	Apply the link between the structure and function of amino acids and Proteins in biological system.
	CO3	Able to know about execute of Biomolecules in human health
	CO4	Analyze and study the chemical and biochemical properties pharmacogenetics field
	CO5	Apply the structural studies to biological processes like replication,transcription and translation.

Programme Code: 07		Programme Title: M.Sc Biochemistry	
Title of the paper Core Paper 2 – Bio analytical Techniques			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To learn the principle and instrumentation of various separation techniques
2. To know the applications of various separation techniques in biological fields
3. To learn the concept of radioactivity and explore its role in various fields.

Course Outcomes (CO)


K1  K5	CO1	Recall the principle and applications of bioinstrumentation
	CO2	The students will discern the principle, Instrumentation of different types of Bio analytical techniques
	CO3	The students also discern about applying the instrumentation techniques of Centrifugation, Electrophoresis and Chromatography in various research
	CO4	The students will determine the knowledge and practice concerning modern analytical instrumentation and students can able to enter into large scale Industries.
	CO5	Appreciate the principle, instrumentation and difference between various spectroscopic methods.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Core Paper 3 – Enzymes and Enzyme Technology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To know the classification and properties of enzymes
2. To learn about the mechanism of enzyme action
3. To know the applications of enzymes in clinical and diagnostic fields

Course Outcomes (CO)

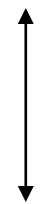
K1  K5	CO1	Remember the fundamentals of enzyme properties
	CO2	Conceive the different procedures involved in enzyme technology
	CO3	Able to assay the enzyme and their kinetics and also apply to this in the industry and other technological field
	CO4	Estimate enzyme technology for the commercialization purpose of biotechnological products
	CO5	Apply purification techniques of enzymes and immobilization techniques.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Core Paper 4 – Cellular Biochemistry			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To learn the models and functions of biological membrane
2. To learn about the structure and functions of cytoplasmic organelles
3. To learn the mechanism of membrane transport in cells

Course Outcomes (CO)


K1  K5	CO1	Recall the basic concepts of cells.
	CO2	Understand the knowledge of cell structure and function
	CO3	Employ their knowledge of cell biology to selected examples of changes or Losses in cell function.
	CO4	Analyze the cell structure, cell signaling and cell functions
	CO5	Decipher the intracellular signaling modes in mitochondria

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title : Core Practical 1 – Biomolecules, Bioinstrumentation, Enzymology and Cell Biology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To get practical experience in analyzing the biochemical metabolites in biological samples, bioinstrumentation, enzyme technology and cell biology techniques
2. To have hands on experience on chromatography, electrophoresis, enzyme and cell biology techniques
3. To develop familiarity with bioanalytical techniques and applications of enzyme and cell biology in research and industries

Course Outcomes (CO)

K1  K5	CO1	Reproduce various concepts in Biomolecules, enzyme and cell biology.
	CO2	Conceive the amount of Biomolecules, isolation, purification and determination of enzyme, preparation of buccal smears
	CO3	Apply the enzyme technology and cell biology skill in basic research projects
	CO4	Assign the principles of Biomolecules, enzyme and cell biology techniques to discovery novel drug development
	CO5	Be competent to perform various biochemical analysis.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper: Core Paper 5–Plant Biochemistry			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To learn the mechanism and importance of photosynthesis in plants
2. To learn the role of hormones in the growth metabolism of plants
3. To know the latest genetic engineering techniques for plant development

Course Outcomes (CO)

K1 ↑ K5	CO1	Recall the biosynthesis of primary and secondary metabolites, nitrogen metabolism involved in plants
	CO2	Understand the concept of plant tissue culture and plant transformation techniques
	CO3	Know about applications of phytoconstituents in development of new Drug
	CO4	Experiment on new technologies in plant biotechnology
	CO5	Evaluate various gene transfer techniques

Sub.Code: 24PBC206

Programme C ode: 07		Programme Title: M.Sc Biochemistry	
Title of the paper: Core Paper 6 – Metabolism and Metabolic Regulation			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To learn the metabolism of various Biomolecules in our system
2. To provide a basic understanding of the biochemical reactions of molecules
3. To study the interrelationship of various metabolic pathways

Course Outcomes (CO)


K1 ↑ ↓ K5	CO1	Remember commemorate the overall concept of cellular metabolism
	CO2	Explain the metabolism of various biochemical pathways
	CO3	Execute the diseases associated with defective nucleotide biosynthesis
	CO4	Analyze the role of fat in energy production and membrane synthesis
	CO5	Define and explain the metabolism in various nutritional status and starvation.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper: Core Paper 7 –Molecular Biology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To understand the molecular organization of genes and chromosomes
2. To learn the process of DNA synthesis, repair and function
3. To learn the various molecular events occurring in DNA with proposed theories

Course Outcomes (CO)

	K1	CO1	Able to define the basic concepts of gene
		CO2	Recognize the different processes involved in replication, transcription and Translation
		CO3	Integrate scientific and technological knowledge on the use of genetics and molecular biology for industrial products on the cell and process level
		CO4	Examine the molecular mechanisms behind DNA damage and repair
	K5	CO5	Appraise the various concepts of regulation of genes.

Sub.Code :24PBC208

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper: Core Paper 8– Drug Biochemistry			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To learn the mechanism of drug action in various diseases
2. To learn about different drugs available for treatment
3. To learn about the designing mechanisms for drug development

Course Outcomes (CO)


K1 ↑ ↓ K5	CO1	Repeat the concept of pharmacology
	CO2	Describe the mechanism of action of drug inside the system
	CO3	Employ the drug discovery and drug design procedures.
	CO4	Examine the treatment of various disorders using drug molecules
	CO5	Contribute in understanding the mode of action of antibiotics.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper: Core Practical 2 – Plant Biochemistry Genetics and Molecular Biology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To learn the techniques of plant tissue culture
2. To get an hands-on-training on molecular techniques
3. To implement the applications of plant tissue culture, microbes, genetics and molecular techniques in research and industries

Course Outcomes (CO)

K1  K5	CO1	Correlate the principles of plant biochemistry, microbes, molecular biology and genetic techniques
	CO2	Demonstrate the technical skills involved in plant tissue culture, counting cells, identification of gene and its expressions
	CO3	Develop and apply the modern technology of plant biochemistry, microbial techniques, molecular biology and genetics in industries and research
	CO4	Examine the results obtained using plant biochemistry, sterilization techniques, molecular biology and genetics
	CO5	Be competent in handling the microbial cultures and plant samples.

Sub.Code :24PBC309

Programme Code: 07		Programme Title: M.Sc Biochemistry	
Title of the paper: Core Paper 9 – Advanced Immunology and immunological techniques			
Batch	Hours / Week	Total Hours	Credits
2024-2025	6	90	5

Course Objectives

1. To learn about the various cells of immune system and their functions
2. To know about the specificity of antigen-antigen interaction and their possible mechanisms
3. To know the role of immunological cells in the treatment of different diseases

Course Outcomes (CO)

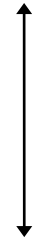
↑ K1	CO1	Recall the types and functions of different immune cells
	CO2	Employ the mechanism of action of different immune cells and their resultant reaction responses
	CO3	Decipher the underlying causes of inherited or autoimmune diseases and consequences
	CO4	Experiment the new technologies involving immune cells in treating many diseases
↓ K5	CO5	Contribute in understanding the important concepts of recombinant Vaccine.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper: Core Paper 10-Biostatistics and Research Methodology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	6	90	4

Course Objectives

1. To learn the different methods of collecting data and processing
2. To know about the different statistical methods to interpret the collected statistical data
3. To know the concept of article writing, report writing and thesis making soon

Course Outcomes (CO)

	K1	CO1	State an idea on choosing the appropriate method of collecting data
		CO2	Employ the statistical method and process the collected data
		CO3	Illustrate the device and standardize the statistical methods
		CO4	Discriminate the concept in preparing a report, publishing an article and writing a project thesis
	K5	CO5	Contribute the research knowledge in report writing.

Sub.Code: 24PBC311

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Core Paper11– Advanced Clinical Biochemistry			
Batch 2024-2025	Hours / Week 7	Total Hours 105	Credits 4

Course Objectives

1. To learn the methodologies for the detection of abnormalities in blood
2. To learn the process of different sample collection and processing
3. To know about the markers in the various metabolic disorders like cancer

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	Correlate the important laboratory biochemical tests
	CO2	Employ the methods of specimen collection and processing and analyzing the results
	CO3	Investigate the role of enzymes in clinical diagnosis of diseases
	CO4	Criticize the diagnostic procedures for tumor development
	CO5	Evaluate the role of free radicals in various diseases.

Sub.Code : 24PBC3CN

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Core Practical 3 – Immunology, Genetic Engineering and Clinical Biochemistry			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To enhance the students to have practical experience on techniques in immunological tests
2. To learn the methods of estimation of clinical parameters
3. To have hands on experience in genetic engineering

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	Recall the basic principles involved in immunology, clinical biochemistry and genetic engineering
	CO2	Demonstrate the techniques involved in immunology, clinical biochemistry and genetic engineering
	CO3	Develop and apply the recent technology involved in diagnostic techniques of immunology, clinical biochemistry and genetic
	CO4	Examine and analyze the results involved in immune techniques, clinical biochemistry and genetic engineering
	CO5	Be competent in handling the blood and urine samples.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Core Paper 12 – Hormonal Biochemistry			
Batch 2024-2025	Hours / Week 5	Total Hours 75	Credits 4

Course Objectives

1. To learn about the system of hormonal functioning in biological systems
2. To know the regulation and action of different hormones at different conditions
3. To get an in depth knowledge on diabetes mellitus

Course Outcomes (CO)

K1 ↑ K5 ↓	CO1	List the diverse group of hormones and their specific mechanism of action in the bodily metabolism
	CO2	Understand the regulatory functions of various hormones and their interrelationship in the endocrine disorders
	CO3	Discuss the pathophysiology, diagnosis, treatment and management of endocrine disorders
	CO4	Differentiate the role of hormones in various biological organs
	CO5	Evaluate the biological action of different hormones.

Sub.Code : 24PBC413

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper :Core Paper 13 –Genetic Engineering			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	4

Course Objectives

1. To enable the students to learn the principle and application of genetic engineering
2. To implement and transmission of a genetic material at molecular and cellular levels.

Course Outcomes (CO)


K1 ↑	CO1	Enshrine the principles of genetic engineering and the vectors used in cloning and expression
	CO2	Grasp the different cloning strategies and their expression
	CO3	Demonstrate about implementation of genetic engineering for different purposes
	CO4	Investigate the different strategies of rDNA technology and resolve the problems encountered
K5 ↓	CO5	Analyze the various techniques of gene therapy.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Major Elective – Microbiology			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	5

Course Objectives

1. To learn about the microbiological techniques for microbial studies
2. To learn the energy process taking place in microbes
3. To learn about the food poisoning and pathogenicity of microbes

Course Outcomes (CO)

K1  K5	CO1	Commemorate the general bacteriology and microbial techniques.
	CO2	Understand the basic microbial structure and function
	CO3	Implement the handling techniques and staining procedures in laboratory
	CO4	Resolve the microbial techniques and its applications
	CO5	Employ the role of microbes in pathogenicity.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
Title of the paper Major Elective: Bioinformatics			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	5

Course Objectives

1. To learn the role of computer programmes in studying the biological processes
2. To know about the different software's for data analysis
3. To learn about the methods of data retrieval from various databases

Course Outcomes (CO)


K1 ↑ ↓ K5	CO1	Learn about the basics and beginning developments in computer usage
	CO2	Employ the basics of bioinformatics
	CO3	Differentiate various bioinformatics soft wares
	CO4	Apply the role bioinformatics in biological science research
	CO5	Apply bio informatics in proteomics and human genome project.

Programme Code: 07		Programme Title: M.Sc Biochemistry	
Title of the paper Major Elective - Bioethics, Biosafety and IPR			
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	5

Course Objectives

1. To learn about the demerits of biotechnological applications in recent research
2. To know the ethical issues to be concerned in the course of biological research
3. To know about the intellectual property rights of individual researchers

Course Outcomes (CO)

K1  K5	CO1	Remember the ethical issues of scientific research
	CO2	Employ the various regulations in Biosafety and bioethics
	CO3	Decipher the awareness of the intellectual property rights
	CO4	Experiment the secured and ethical way of research
	CO5	Contribute the knowledge in filing the patents.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper :Non-Major Elective : Information Security		
Batch 2024-2025	Hours/Week 4	Total Hours 60	Credits 4

Course Objectives

1. Students will identify the core concepts of Information security.
2. To examine the concepts of Information Security.
3. To design and implement the security features for IT and Industrial sectors.

Course Outcomes (CO)


K1	CO1	To Learn the principles and fundamentals of information security.
K2	CO2	To Demonstrate the knowledge of Information security concepts
K3	CO3	To Understand about Information Security Architecture.
K4	CO4	To Analyze the various streams of security in IT and Industrial sector.
K5	CO5	To know about Cyber Laws and Regulations.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper Non Major Elective – Bioprocess Technology		
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	5

Course Objectives

1. To understand the basics of fermentation techniques
2. To learn the concepts of screening, optimization and maintenance of cultures
3. To provide the basics of bioprocess technology

Course Outcomes (CO)

K1  K4	CO1	Remember the basics of bioreactors
	CO2	Understanding of the various aspects of bioprocess techniques
	CO3	Employ in biotechnological industries
	CO4	Distinguish the fermentation process and its kinetics
	CO5	Appraise the role of bioreactors in various industries.

Programme code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper Non Major Elective – Cancer Biology		
Batch	Hours / Week	Total Hours	Credits
2024-2025	5	75	5

Course Objectives

1. To know the biology of cancer development
2. To know the features of various cancer types
3. To know about the mechanism of cancer cell cycle
4. To learn the screening and diagnosis methods for cancers
5. To learn the treatment strategies for various cancers

Course Outcomes (CO)

↑ ↓	K1	CO1	Remember the basic knowledge on cancer development
		CO2	Understand the molecular mechanisms of cancer cell cycle
		CO3	Apply the techniques for diagnosis of various cancers
		CO4	Contribute the role of different treatment strategies and its application
	K5	CO5	Employ various strategies in the treatment of cancer

Sub.Code :24PBC3X1

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper : EDC – Nutritional Biochemistry		
Batch 2024-2025	Hours / Week 2	Total Hours 30	Credits 5

Course Objectives

1. To impart the knowledge on historical overview of nutrition, essential nutrients for metabolism
2. To provide an overview of the major macro and micronutrients relevant to human health
3. To discuss the scientific rationale for defining nutritional requirements in healthy individuals and populations, with reference to specific conditions such as pregnancy, lactation, and older age

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	Assess the nutritional status of community in order to determine the type magnitude and distribution of malnutrition
	CO2	Describe the biochemical and physiological functions of the nutrients and their Integrated role.
	CO3	Evaluate the therapeutic role of key nutrients in maintaining health.
	CO4	Discriminate the diseases caused due to protein deficiency
	CO5	Employ the role of diet in various diseases.

Sub code: 24PBCOD1

Programme Code: 07	Programme Title: M.Sc Biochemistry
Title of the paper ALC – Forensic Science	
Batch 2024-2025	Credits 2

Course Objectives

1. To deals with the forensic aspects like legal procedures and types of trauma.
2. To assist and develops regulation in forensic science
3. To give students with a sound basis in forensic science

Course Outcomes (CO)


K1 ↑ ↓ K5	CO1	Define the basic concepts of forensic science
	CO2	Understand the identification procedures employed under forensics Science
	CO3	Apply the fingerprint analysis and interpretations in research fields
	CO4	Examine and analyze the results involved in fingerprinting technique
	CO5	Evaluate the physical analysis and injuries.

Programme Code: 07	Programme Title: M.Sc Biochemistry
Title of the paper ALC – Nutraceuticals and Functional Foods	
Batch 2024-2025	Credits 2

Course Objectives

1. To learn the concept of nutraceuticals and functional foods
2. To know the available biochemical compounds in our system
3. To prepare functional foods from nutraceutical compounds

Course Outcomes (CO)

K1  K5	CO1	Remember the complete history of nutraceuticals
	CO2	Classify the different nutraceuticals
	CO3	Illustrate the formulation methods of functional foods
	CO4	Distinguish the role of functional foods in disease prevention and management
	CO5	Employ the role of nutraceuticals in various disorders.

Sub Code: 24PBCOD3

Programme Code: 07	Programme Title: M.Sc Biochemistry	
	Title of the paper ALC –Stem Cell Biology	
Batch 2024-2025		Credits 2

Course Objectives

1. To learn about the technology of stem cells preparation
2. To learn the properties of stem cells
3. To prepare stem cells for gene therapy

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	Recall the different types of stem cells and its applications
	CO2	Explain the importance of gene therapy in various diseases
	CO3	Interpret implement the stem cell in therapies
	CO4	Examine the molecular concepts of stem cell
	CO5	Appraise the role of stem cells in various disorders.

Sub Code:24PBCOJ1

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper JOC –Bio-Entrepreneurship		
Batch 2024-2025	Hours / Week 2	Total Hours 30	Credits 4

Course Objectives

1. To learn about the concepts of entrepreneurship
2. To study the various opportunities in launching and running a business
3. To know the various strategies of effective entrepreneurship

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	List the concepts of entrepreneurship
	CO2	Report the different strategies adopted for a better entrepreneurship
	CO3	Discriminate the various biological entrepreneurship programmes
	CO4	Apply the quipped enough to become an entrepreneur
	CO5	Employ in understanding about the marketing of products.

Sub Code: 24PBC0J2

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper JOC - Food Safety and Quality Control		
Batch 2024-2025	Hours / Week 2	Total Hours 30	Credits 4

Course Objectives

1. To learn the principles of food quality control
2. To learn the methodologies to standardize and ensuring food safety
3. To gain knowledge on the framed food safety regulations

Course Outcomes (CO)

K1 ↑ ↓ K5	CO1	Repeat the various steps in the quality control of food items
	CO2	Classify the various food standards
	CO3	Illustrate the various methods to determine the quality of foods
	CO4	Examine the various regulations concerned with the food quality issues
	CO5	Evaluate the methods in standardization of quality control of foods.

Programme Code: 07	Programme Title: M.Sc Biochemistry		
	Title of the paper JOC –Clinical and Therapeutic Nutrition		
Batch 2024-2025	Hours / Week 2	Total Hours 30	Credits 4

Course Objectives

1. To enable the basic principles of clinical nutrition
2. To understand the clinical significance of biochemical findings
3. To develop skills in planning and preparation of therapeutic diets for various diseases

Course Outcomes (CO)

K1 ↑ ↓	CO1	Commemorate the basics of nutritional care
	CO2	Explain the relation between nutrition and health
	CO3	Interpret the lifestyle and nutritional assessment techniques
K5	CO4	Analyze the main nutrients and its functions in the body
	CO5	Appraise the role of probiotics in diet.