

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited by NAAC with 'A' Grade – 3.64 CGPA out of 4 (3rd Cycle)

College of Excellence (UGC)

Coimbatore – 641 029

DEPARTMENT OF BIOCHEMISTRY (Unaided)

COURSE OUTCOMES (CO)

M.Sc. BIOCHEMISTRY

**For the students admitted
In the
Academic Year 2018-2019**

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC101		Title: Core Paper 1 – Biomolecules		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	5	75	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	CO1	The students recollect the classification and functions of biomolecules
K2	CO2	The students will grasp the scope of biological chemistry
K3	CO3	The students also know about execute of biomolecules in human health
K4	CO4	The students will analyse and study the chemical and biochemical properties of biomolecule. They can able to enter into drug design and pharmacogenetics field

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC102		Title: Core Paper 2 – Bioanalytical Techniques		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	5	75	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	CO1	The students recall the principle and applications of bioinstrumentation
K2	CO2	The students will discern the principle, Instrumentation of different types of bioanalytical techniques
K3	CO3	The students also discern about applying the instrumentation techniques of Centrifugation, Electrophoresis and Chromatography in various research fields
K4	CO4	The students will determine the knowledge and practice concerning modern analytical instrumentation and students can able to enter into large scale industries.

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC103		Title: Core Paper 3 – Enzymes and Enzyme Technology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	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	CO1	The students remember the fundamentals of enzyme properties
K2	CO2	The students conceive the different procedures involved in enzyme technology
K3	CO3	The students will be able to assay the enzyme and their kinetics and also apply to this in the industry and other technological field
K4	CO4	The students estimate enzyme technology for the commercialization purpose of biotechnological products

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC104		Title: Core Paper 4 – Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	5	75	4

Course Objectives

1. To learn the models and functions of biological membrane
2. To learn the mechanism of membrane transport in cells
3. To learn about the cell cycle and cancer

Course Outcomes (CO)

K1	CO1	The students will be able to elicit the basic concepts of cell biology
K2	CO2	The students will understand the knowledge of cell structure and function, protein sorting and cancer
K3	CO3	The students will apply their knowledge of cell biology to selected examples of changes or losses in cell function.
K4	CO4	The students analyse the cell structure, cell signaling and cell cycle

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC105		Title: Core Paper 5 – Plant Biochemistry and Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	5	75	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	CO1	The students recall the biosynthesis of primary and secondary metabolites, nitrogen metabolism involved in plants
K2	CO2	The students understand the concept of plant tissue culture and plant transformation techniques
K3	CO3	The students also know about applications of phytoconstituents in development of new drug
K4	CO4	The students can device new technologies involving plant biotechnology

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC1CL		Title: Core Practical 1 – Lab in Biomolecules, Bioinstrumentation, Enzymology and Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	I	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	CO1	The students will learn how to standardize various Biomolecules, enzyme and cell biology.
K2	CO2	The students conceive the amount of Biomolecules, isolation, purification and determination of enzyme, preparation of buccal smears
K3	CO3	The students apply the enzyme technology and cell biology skill in basic research projects
K4	CO4	The students also assign the principles of Biomolecules, enzyme and cell biology techniques to discovery novel drug development

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC206		Title: Core Paper 6 – Hormonal Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	II	5	75	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	CO1	The students know about the diverse group of hormones and their specific mechanism of action in the bodily metabolism
K2	CO2	The students learn the regulatory functions of various hormones and their interrelationship in the endocrine disorders
K3	CO3	The students acquire knowledge on the pathophysiology, diagnosis, treatment and management of endocrine disorders
K4	CO4	The students will be made equipped with the hormonal concepts and disease predictions

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC207		Title: Core Paper 7 – Intermediary Metabolism		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	II	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	CO1	The students remember commemorate the overall concept of cellular metabolism
K2	CO2	The students perceive the metabolism of biochemical pathways
K3	CO3	The students execute the diseases associated with defective nucleotide biosynthesis
K4	CO4	To analyze the role of fat in energy production and membrane synthesis

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC208		Title: Core Paper 8 –Genetics and Molecular Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	II	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	The students recognize about the basic concepts of gene
K2	CO2	The students understand the different processes involved in replication, transcription and translation
K3	CO3	The students can be able to integrate scientific and technological knowledge on the use of genetics and molecular biology for industrial products on the cell and process level
K4	CO4	The students will examine the molecular mechanisms behind DNA damage and repair

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC209		Title: Core Paper 9 –Drug Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	II	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	CO1	The students will learn the concept of pharmacology
K2	CO2	The students can know about the mechanism of action of drug inside the system
K3	CO3	The students will know about the drug discovery and drug design procedures
K4	CO4	The students will know the treatment of various disorders using drug molecules

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC2CM		Title: Core Practical 2 –Lab in Plant Biochemistry, Microbiology, Genetics and Molecular Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	II	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	CO1	The students know about the principles of plant biochemistry, microbes, molecular biology and genetic techniques
K2	CO2	The students gain the technical skills involved in plant tissue culture, counting cells, identification of gene and its expressions
K3	CO3	The students develop and apply the modern technology of plant biochemistry, microbial techniques, molecular biology and genetics in industries and research
K4	CO4	The students will examine the results obtained using plant biochemistry, sterilization techniques, molecular biology and genetics

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC310		Title: Core Paper 10 – Immunology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	III	5	75	4

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	The students can learn the types and functions of different immune cells
K2	CO2	The students can know the mechanism of action of different immune cells and their resultant reaction responses
K3	CO3	The students will understand the underlying causes of inherited or autoimmune diseases and consequences
K4	CO4	The students can device new technologies involving immune cells in treating many diseases

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC311		Title: Core Paper 11 –Genetic Engineering		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	III	5	75	4

Course Objectives

1. To learn the cloning strategies and genetic manipulation with devised technologies
2. To enable the students to learn the principle and application of genetic engineering
3. To implement and transmission of a genetic material at molecular and cellular levels.

Course Outcomes (CO)

K1	CO1	The students enshrine the principles of genetic engineering and the vectors used in cloning and expression
K2	CO2	The students will grasp the different cloning strategies and their expression
K3	CO3	The students also know about implementation of genetic engineering for different purposes
K4	CO4	The students will investigate the different strategies of rDNA technology and resolve the problems encountered

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC312		Title: Core Paper 12 – Clinical Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	III	5	75	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	CO1	The students will be knowing the important laboratory biochemical tests
K2	CO2	The students will be introduced to methods of specimen collection and processing and analyzing the results
K3	CO3	The students will be learning the role of enzymes in clinical diagnosis of diseases
K4	CO4	The students will be knowing the diagnostic procedures for tumor development

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC313		Title: Core Paper 13 - Biostatistics and Research Methodology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	III	5	75	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 so on

Course Outcomes (CO)

K1	CO1	The students get an idea on choosing the appropriate method of collecting data
K2	CO2	The students learn how to select the statistical method and process the collected data
K3	CO3	The students can device and standardize the statistical methods
K4	CO4	The students will be well versed in preparing a report, publishing an article and writing a project thesis

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC3CN		Title: Core Practical 3 – Lab in Immunology, Genetic Engineering and Clinical Biochemistry		
Batch 2018-2019	Semester III	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	CO1	The students recall the basic principles involved in immunology, clinical biochemistry and genetic engineering
K2	CO2	The students demonstrate the techniques involved in immunology, clinical biochemistry and genetic engineering
K3	CO3	The students develop and apply the recent technology involved in diagnostic techniques of immunology, clinical biochemistry and genetic
K4	CO4	The students examine and analyze the results involved in immune techniques, clinical biochemistry and genetic engineering

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective: Nanobiotechnology		
Batch 2018-2019	Semester NA	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To get an idea about the application of nanotechnology in biological research
2. To learn the properties and functions of nanomaterials in biological systems
3. To learn the applications of nanomaterials in drug delivery and treatment

Course Outcomes (CO)

K1	CO1	The students will get an insight about the nanotechnology concepts
K2	CO2	The students will learn the methods of nanoparticle synthesis
K3	CO3	The students will learn the properties of nanoparticles
K4	CO4	The student can know the application of nanotechnology in biological research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective – Microbiology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	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	CO1	The students commemorate the general bacteriology and microbial techniques.
K2	CO2	The students understand the basic microbial structure and function
K3	CO3	The students also implement the handling techniques and staining procedures in laboratory
K4	CO4	The students resolve the microbial techniques and its applications

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective: Bioinformatics		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	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	CO1	The students will learn about the basics and beginning developments in computer usage
K2	CO2	The students will know the basics of bioinformatics
K3	CO3	The students will learn about the different bioinformatics softwares
K4	CO4	The students will learn about the application of bioinformatics in biological science research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective - Bioethics, Biosafety and IPR		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	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	CO1	The students can know about the ethical issues of scientific research
K2	CO2	The students can learn the various regulations in biosafety and bioethics
K3	CO3	The students will be aware of the intellectual property rights
K4	CO4	The students will move into secured and ethical way of research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Environmental Management		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	5	75	5

Course Objectives:

1. To learn the various issues pertaining to the environment
2. To combat the environmental issues with efficient strategies
3. To assess the various existing environmental risk issues

Course Outcomes (CO)

K1	CO1	The students will learn about the subject of environmental management
K2	CO2	The students learn the issues concerned with environmental management
K3	CO3	The students can analyse the various issues of importance
K4	CO4	The students can take a right decision on combating upcoming environmental issues

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Competitive Science		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	5	75	5

Course Objectives

1. To insist the various facts of life sciences in detail
2. To learn the various information regarding the biological processes
3. To expose the students to the online examination

Course Outcomes (CO)

K1	CO1	The students can learn the subjects in detail
K2	CO2	The students can get a consolidated view of life science subjects
K3	CO3	The student can develop the analytical capability by learning the objective type questions
K4	CO4	The students can undertake competitive examinations will necessary preparation

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Bioprocess Technology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	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	CO1	The students can remember the basics of bioreactors
K2	CO2	The students can understanding of the various aspects of bioprocess techniques
K3	CO3	The student can employ in biotechnological industries
K4	CO4	The students can examine the fermentation process and its kinetics

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Animal and Plant Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	5	75	5

Course Objectives

1. To understand and learn various culturing techniques of animal cells
2. To know the production of transgenic animals and its application
3. To enable various culturing technologies of plant cells (*in vitro*) gene transferring mechanism

Course Outcomes (CO)

K1	CO1	To remember the basic knowledge on tissue culture
K2	CO2	To understand the molecular techniques and expression vectors
K3	CO3	The student can apply the techniques in various field of biotechnological industries
K4	CO4	The students can evaluate the role of culture techniques and its application

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC0D1		Title: ALC – Forensic Science		
Batch 2018-2019	Semester NA	Hours / Week NA	Total Hours NA	Credits 4

Course Objectives

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

Course Outcomes (CO)

K1	CO1	The students will use the basic concepts of forensic science
K2	CO2	The students will understanding of identification procedures employed under forensics science
K3	CO3	The students will apply the fingerprint analysis and interpretations in research fields
K4	CO4	The students examine and analyze the results involved in fingerprinting technique

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBCOD2		Title: ALC – Nutraceuticals and Functional Foods		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	NA	NA	4

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	CO1	The students will learn the complete history of nutraceuticals
K2	CO2	The students will learn the different nutraceuticals
K3	CO3	The students will learn the formulation methods of functional foods
K4	CO4	The students will learn about the role of functional foods in disease prevention and management

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBCOD3		Title: ALC –Stem Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2018-2019	NA	NA	NA	4

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	CO1	The students will recall the different types of stem cells and its applications
K2	CO2	The students also understand the importance of gene therapy in various diseases
K3	CO3	The students will implement the stem cell in therapies
K4	CO4	The students examine the molecular concepts of stem cell

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBCOJ1		Title: JOC – Bio-Entrepreneurship		
Batch 2018-2019	Semester NA	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	CO1	The students will come to know about the concepts of entrepreneurship
K2	CO2	The students will learn the different strategies adopted for a better entrepreneurship
K3	CO3	The students will learn about the various biological entrepreneurship programmes
K4	CO4	The students will be equipped enough to become an entrepreneur

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBC0J2		Title: JOC - Food Safety and Quality Control		
Batch 2018-2019	Semester NA	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	CO1	The students will learn about the various steps in the quality control of food items
K2	CO2	The students will learn about the various food standards
K3	CO3	The students will learn about the various methods to determine the quality of foods
K4	CO4	The students will be aware of the various regulations concerned with the food quality issues

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 18PBCOJ3		Title: JOC –Clinical and Therapeutic Nutrition		
Batch 2018-2019	Semester NA	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	The students commemorate the basics of nutritional care
K2	CO2	The students will discern the relation between nutrition and health
K3	CO3	The students will apply lifestyle and nutritional assessment techniques
K4	CO4	The students analyze the main nutrients and its functions in the body

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)

Re-accredited by NAAC with 'A' Grade – 3.64 CGPA out of 4 (3rd Cycle)

College of Excellence (UGC)

Coimbatore – 641 029

DEPARTMENT OF BIOCHEMISTRY (Unaided)

COURSE OUTCOMES (CO)

M.Sc. BIOCHEMISTRY

For the students admitted

In the

Academic Year 2019-2020

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC101		Title: Core Paper 1 – Biomolecules		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	5	75	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	CO1	The students recollect the classification and functions of biomolecules
K2	CO2	The students will grasp the scope of biological chemistry
K3	CO3	The students also know about execute of biomolecules in human health
K4	CO4	The students will analyse and study the chemical and biochemical properties of biomolecule. They can able to enter into drug design and pharmacogenetics field

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC102		Title: Core Paper 2 – Bioanalytical Techniques		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	5	75	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	CO1	The students recall the principle and applications of bioinstrumentation
K2	CO2	The students will discern the principle, Instrumentation of different types of bioanalytical techniques
K3	CO3	The students also discern about applying the instrumentation techniques of Centrifugation, Electrophoresis and Chromatography in various research fields
K4	CO4	The students will determine the knowledge and practice concerning modern analytical instrumentation and students can able to enter into large scale industries.

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC103		Title: Core Paper 3 – Enzymes and Enzyme Technology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	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	CO1	The students remember the fundamentals of enzyme properties
K2	CO2	The students conceive the different procedures involved in enzyme technology
K3	CO3	The students will able to assay the enzyme and their kinetics and also apply to this in the industry and other technological field
K4	CO4	The students estimate enzyme technology for the commercialization purpose of biotechnological products

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC104		Title: Core Paper 4 – Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	5	75	4

Course Objectives

1. To learn the models and functions of biological membrane
2. To learn the mechanism of membrane transport in cells
3. To learn about the cell cycle and cancer

Course Outcomes (CO)

K1	CO1	The students will be able to elicit the basic concepts of cell biology
K2	CO2	The students will understand the knowledge of cell structure and function, protein sorting and cancer
K3	CO3	The students will apply their knowledge of cell biology to selected examples of changes or losses in cell function.
K4	CO4	The students analyse the cell structure, cell signaling and cell cycle

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC105		Title: Core Paper 5 – Plant Biochemistry and Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	5	75	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	CO1	The students recall the biosynthesis of primary and secondary metabolites, nitrogen metabolism involved in plants
K2	CO2	The students understand the concept of plant tissue culture and plant transformation techniques
K3	CO3	The students also know about applications of phytoconstituents in development of new drug
K4	CO4	The students can device new technologies involving plant biotechnology

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC1CL		Title: Core Practical 1 – Lab in Biomolecules, Bioinstrumentation, Enzymology and Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	I	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	CO1	The students will learn how to standardize various Biomolecules, enzyme and cell biology.
K2	CO2	The students conceive the amount of Biomolecules, isolation, purification and determination of enzyme, preparation of buccal smears
K3	CO3	The students apply the enzyme technology and cell biology skill in basic research projects
K4	CO4	The students also assign the principles of Biomolecules, enzyme and cell biology techniques to discovery novel drug development

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC206		Title: Core Paper 6 – Hormonal Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	II	5	75	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	CO1	The students know about the diverse group of hormones and their specific mechanism of action in the bodily metabolism
K2	CO2	The students learn the regulatory functions of various hormones and their interrelationship in the endocrine disorders
K3	CO3	The students acquire knowledge on the pathophysiology, diagnosis, treatment and management of endocrine disorders
K4	CO4	The students will be made equipped with the hormonal concepts and disease predictions

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC207		Title: Core Paper 7 – Intermediary Metabolism		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	II	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	CO1	The students remember commemorate the overall concept of cellular metabolism
K2	CO2	The students perceive the metabolism of biochemical pathways
K3	CO3	The students execute the diseases associated with defective nucleotide biosynthesis
K4	CO4	To analyze the role of fat in energy production and membrane synthesis

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC208		Title: Core Paper 8 –Genetics and Molecular Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	II	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	The students recognize about the basic concepts of gene
K2	CO2	The students understand the different processes involved in replication, transcription and translation
K3	CO3	The students can be able to integrate scientific and technological knowledge on the use of genetics and molecular biology for industrial products on the cell and process level
K4	CO4	The students will examine the molecular mechanisms behind DNA damage and repair

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC209		Title: Core Paper 9 –Drug Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	II	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	CO1	The students will learn the concept of pharmacology
K2	CO2	The students can know about the mechanism of action of drug inside the system
K3	CO3	The students will know about the drug discovery and drug design procedures
K4	CO4	The students will know the treatment of various disorders using drug molecules

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC2CM		Title: Core Practical 2 –Lab in Plant Biochemistry, Microbiology, Genetics and Molecular Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	II	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	CO1	The students know about the principles of plant biochemistry, microbes, molecular biology and genetic techniques
K2	CO2	The students gain the technical skills involved in plant tissue culture, counting cells, identification of gene and its expressions
K3	CO3	The students develop and apply the modern technology of plant biochemistry, microbial techniques, molecular biology and genetics in industries and research
K4	CO4	The students will examine the results obtained using plant biochemistry, sterilization techniques, molecular biology and genetics

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC310		Title: Core Paper 10 – Immunology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	III	5	75	4

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	The students can learn the types and functions of different immune cells
K2	CO2	The students can know the mechanism of action of different immune cells and their resultant reaction responses
K3	CO3	The students will understand the underlying causes of inherited or autoimmune diseases and consequences
K4	CO4	The students can device new technologies involving immune cells in treating many diseases

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC311		Title: Core Paper 11 –Genetic Engineering		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	III	5	75	4

Course Objectives

1. To learn the cloning strategies and genetic manipulation with devised technologies
2. To enable the students to learn the principle and application of genetic engineering
3. To implement and transmission of a genetic material at molecular and cellular levels.

Course Outcomes (CO)

K1	CO1	The students enshrine the principles of genetic engineering and the vectors used in cloning and expression
K2	CO2	The students will grasp the different cloning strategies and their expression
K3	CO3	The students also know about implementation of genetic engineering for different purposes
K4	CO4	The students will investigate the different strategies of rDNA technology and resolve the problems encountered

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC312		Title: Core Paper 12 – Clinical Biochemistry		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	III	5	75	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	CO1	The students will be knowing the important laboratory biochemical tests
K2	CO2	The students will be introduced to methods of specimen collection and processing and analyzing the results
K3	CO3	The students will be learning the role of enzymes in clinical diagnosis of diseases
K4	CO4	The students will be knowing the diagnostic procedures for tumor development

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC313		Title: Core Paper 13 - Biostatistics and Research Methodology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	III	5	75	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 so on

Course Outcomes (CO)

K1	CO1	The students get an idea on choosing the appropriate method of collecting data
K2	CO2	The students learn how to select the statistical method and process the collected data
K3	CO3	The students can device and standardize the statistical methods
K4	CO4	The students will be well versed in preparing a report, publishing an article and writing a project thesis

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC3CN		Title: Core Practical 3 – Lab in Immunology, Genetic Engineering and Clinical Biochemistry		
Batch 2019-2020	Semester III	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	CO1	The students recall the basic principles involved in immunology, clinical biochemistry and genetic engineering
K2	CO2	The students demonstrate the techniques involved in immunology, clinical biochemistry and genetic engineering
K3	CO3	The students develop and apply the recent technology involved in diagnostic techniques of immunology, clinical biochemistry and genetic
K4	CO4	The students examine and analyze the results involved in immune techniques, clinical biochemistry and genetic engineering

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective: Nanobiotechnology		
Batch 2019-2020	Semester NA	Hours / Week 5	Total Hours 75	Credits 5

Course Objectives

1. To get an idea about the application of nanotechnology in biological research
2. To learn the properties and functions of nanomaterials in biological systems
3. To learn the applications of nanomaterials in drug delivery and treatment

Course Outcomes (CO)

K1	CO1	The students will get an insight about the nanotechnology concepts
K2	CO2	The students will learn the methods of nanoparticle synthesis
K3	CO3	The students will learn the properties of nanoparticles
K4	CO4	The student can know the application of nanotechnology in biological research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective – Microbiology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	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	CO1	The students commemorate the general bacteriology and microbial techniques.
K2	CO2	The students understand the basic microbial structure and function
K3	CO3	The students also implement the handling techniques and staining procedures in laboratory
K4	CO4	The students resolve the microbial techniques and its applications

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective: Bioinformatics		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	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	CO1	The students will learn about the basics and beginning developments in computer usage
K2	CO2	The students will know the basics of bioinformatics
K3	CO3	The students will learn about the different bioinformatics softwares
K4	CO4	The students will learn about the application of bioinformatics in biological science research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Major Elective - Bioethics, Biosafety and IPR		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	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	CO1	The students can know about the ethical issues of scientific research
K2	CO2	The students can learn the various regulations in biosafety and bioethics
K3	CO3	The students will be aware of the intellectual property rights
K4	CO4	The students will move into secured and ethical way of research

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Environmental Management		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	5	75	5

Course Objectives:

1. To learn the various issues pertaining to the environment
2. To combat the environmental issues with efficient strategies
3. To assess the various existing environmental risk issues

Course Outcomes (CO)

K1	CO1	The students will learn about the subject of environmental management
K2	CO2	The students learn the issues concerned with environmental management
K3	CO3	The students can analyse the various issues of importance
K4	CO4	The students can take a right decision on combating upcoming environmental issues

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Competitive Science		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	5	75	5

Course Objectives

1. To insist the various facts of life sciences in detail
2. To learn the various information regarding the biological processes
3. To expose the students to the online examination

Course Outcomes (CO)

K1	CO1	The students can learn the subjects in detail
K2	CO2	The students can get a consolidated view of life science subjects
K3	CO3	The student can develop the analytical capability by learning the objective type questions
K4	CO4	The students can undertake competitive examinations will necessary preparation

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Bioprocess Technology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	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	CO1	The students can remember the basics of bioreactors
K2	CO2	The students can understanding of the various aspects of bioprocess techniques
K3	CO3	The student can employ in biotechnological industries
K4	CO4	The students can examine the fermentation process and its kinetics

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: NA		Title: Non Major Elective – Cancer Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	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	To remember the basic knowledge on cancer development
K2	CO2	To understand the molecular mechanisms of cancer cell cycle
K3	CO3	The student can apply the techniques for diagnosis of various cancers
K4	CO4	The students can evaluate the role of different treatment strategies and its application

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC0D1		Title: ALC – Forensic Science		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	NA	NA	4

Course Objectives

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

Course Outcomes (CO)

K1	CO1	The students will use the basic concepts of forensic science
K2	CO2	The students will understanding of identification procedures employed under forensics science
K3	CO3	The students will apply the fingerprint analysis and interpretations in research fields
K4	CO4	The students examine and analyze the results involved in fingerprinting technique

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBCOD2		Title: ALC – Nutraceuticals and Functional Foods		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	NA	NA	4

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	CO1	The students will learn the complete history of nutraceuticals
K2	CO2	The students will learn the different nutraceuticals
K3	CO3	The students will learn the formulation methods of functional foods
K4	CO4	The students will learn about the role of functional foods in disease prevention and management

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBCOD3		Title: ALC –Stem Cell Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2019-2020	NA	NA	NA	4

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	CO1	The students will recall the different types of stem cells and its applications
K2	CO2	The students also understand the importance of gene therapy in various diseases
K3	CO3	The students will implement the stem cell in therapies
K4	CO4	The students examine the molecular concepts of stem cell

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBCOJ1		Title: JOC – Bio-Entrepreneurship		
Batch 2019-2020	Semester NA	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	CO1	The students will come to know about the concepts of entrepreneurship
K2	CO2	The students will learn the different strategies adopted for a better entrepreneurship
K3	CO3	The students will learn about the various biological entrepreneurship programmes
K4	CO4	The students will be equipped enough to become an entrepreneur

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBC0J2		Title: JOC - Food Safety and Quality Control		
Batch 2019-2020	Semester NA	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	CO1	The students will learn about the various steps in the quality control of food items
K2	CO2	The students will learn about the various food standards
K3	CO3	The students will learn about the various methods to determine the quality of foods
K4	CO4	The students will be aware of the various regulations concerned with the food quality issues

Programme Code: 07		Programme Title: M.Sc Biochemistry		
Course Code: 19PBCOJ3		Title: JOC –Clinical and Therapeutic Nutrition		
Batch 2019-2020	Semester NA	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	The students commemorate the basics of nutritional care
K2	CO2	The students will discern the relation between nutrition and health
K3	CO3	The students will apply lifestyle and nutritional assessment techniques
K4	CO4	The students analyze the main nutrients and its functions in the body