KONGUNADU ARTS AND SCIENCE COLLEGE

(AUTONOMOUS)

COIMBATORE – 641 029

DEPARTMENT OF BIOTECHNOLOGY (Unaided)

COURSE OUTCOMES (CO)

OF

M.Sc. BIOTECHNOLOGY

For the students admitted In the Academic Year 2022-2023

DEPARTMENT OF BIOTECHNOLOGY (PG)

(2022 - 2023)

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT101		Core Paper 1- Biochemistry		
Batch 2022-2023	Semester I	Hours / Week 5	Total Hours 65	Credits 4

Course objectives

1. To appraise the role of biomolecules in cells
2. To study about the structure and biological functions of macromolecules such as proteins, polysaccharides, lipids
3. To Describe the basic reaction types and mechanisms of biomolecules
4. To Identify the structural differences and its properties

Course outcomes

After completion of the course, the students will be able to:

K1	CO1	Employ the principles of thermodynamics to various systems
↕	CO2	Explain the structure and properties of carbohydrates and Proteins
	CO3	Classify lipids with examples, Combine the structure and functions of lipids
	CO4	Analyse and study the chemical and biochemical properties of biomolecules
K5	CO5	Correlate the metabolism of different biomolecules

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 21PBT102		Core Paper 2 – Biology of Cell		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	5	65	4

Course Objectives

1. To stimulate exploration of concepts and current approaches in modern cell biology
2. To sensitize students to the dynamic behavior of Cytoskeleton
3. To illustrate the interconnection and feedback between the matrix surroundings of cells
4. To provide an in depth knowledge on cell division cycle and cancer

Course Outcomes

After completion of the course, the students will be able to:

K1	CO1	Quantify and purify different cell types
↕	CO2	Prudently use the basics of cellular communication for developing novel tools
	CO3	Devise new molecular tools for prognosis of cancer
	CO4	Correlate the cell cycle to onset of cancer and progression
K5	CO5	Comprehend signaling networks to decipher cellular conditions

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT103		Core Paper 3 – Applied Microbiology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	5	65	4

Course Objectives

1. To make the students to understand the basic concepts of the biology of microorganisms and its mechanism of action in host cells
2. To learn the microbiological techniques used for the classification of microorganisms
3. To understand the microbe-host interaction and their metabolic activities
4. To introduce the role of microorganisms in pathogenesis

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Recollect the early development and physiology of microbes
	CO2	Understand the microbial taxonomy and classification methods
	CO3	Apply the knowledge of microbiological methods to study about the microbes by phenotypic and genotypic methods
	CO4	Apply the knowledge to decipher food spoilage due to cause of microbial contamination and food preservation methods
	CO5	Devise methods of microbial containment in industrial and hospital environments

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT104		Core Paper 4- Bioinformatics		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	4	60	4

Course Objectives

1. To inculcate students with the rapidly evolving field of bioinformatics
2. To learn about the bioinformatics databases, databanks and data format data retrieval from the online sources
3. To understand the essential features of the interdisciplinary field of science for better understanding biological data.
4. To provide a strong foundation for performing further research in bioinformatics

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑	CO1	Apply various computational methods and tools used for protein secondary structure prediction and genome analysis
	CO2	Describe about sequence alignment and similarity search tools
	CO3	Implement computational solutions to basic problems in biological science
	CO4	Analyze the docking studies of biomolecules and implement in pharmacological drug-lead compound analysis
↓ K5	CO5	Relate the sequence, structure and functions of biological molecules

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT1CL		Core Practical 1- Lab in Biochemistry, Cellular Biology and Microbiology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	6	75	3

Course Objectives

1. To get hands on experience and to learn the principles behind molecular and microbiological techniques
2. To give hands on experience in estimation of nucleic acids and isolation of cell organelles
3. To train the students on microbiological media preparation, isolation of microbes and staining techniques
4. To introduce the basic methods of cellular characterisation

Course Outcomes (CO)

After completion of the course, the students will be able to:

K3 ↕ K5	CO1	Extend the hands on experience on standard solution preparation for experimentation
	CO2	Demonstrate the various pure culture as well as the staining techniquesof microbiology and methods in Molecular Genetics
	CO2	Develop and apply molecular and microbiological techniques for research as well as for in the various fields of applied science
	CO4	Examine and analyze the results behind the molecular and microbiological techniques for the development of new techniques infuture
	CO5	Employ various methods of cellular biology to the high end research

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code:22PBT205		Core Paper 5- Molecular Biology and Genetics		
Batch 2022-2023	Semester II	Hours / Week 5	Total Hours 65	Credits 4

Course Objectives

1. To understand the concept of replication and mutation
2. To introduce the concepts of transcription and its regulation in eukaryotes
3. To understand the overall mechanism of protein synthesis machinery in prokaryote and eukaryote
4. To study the human inherited disorders and the factors determining the population genetics

Course Outcome (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Describe the gene expression and its regulation mechanism
	CO2	Apply the mutational effects and its analysis in different fields
	CO3	Investigate the chromosome and gene linked inherited diseases
	CO4	Compare and contrast the variation in population genetics through different genetic analysis
	CO5	Interpret molecular events in eukaryotes

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT206		Core Paper 6 - Genetic Engineering		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	II	4	60	4

Course Objectives:

1. To acquaint on the versatile tools and techniques employed in genetic engineering and recombinant DNA technology
2. To provide theoretical base to properties and applications of DNA modifying enzymes and cloning strategies
3. To understand vector types, host genotype specificities for selection and screening of recombinants and/or recombinant transformants
4. To comprehend the various strategies for studying recombinant DNA molecules and its application in myriad fields

Course Outcomes (CO):

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Apply the technical knowhow on manipulating genes and genomes
	CO2	Showcase the knowledge to construct clones and apply them for cloning in different hosts
	CO3	Be competent in handling PCR and related techniques for various applications
	CO4	Be proficient in conducting genetic engineering experiments
	CO5	Be competent enough to handle recombinant strains at an industrial scale

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT207		Core Paper 7- Immunology and Immunotechnology		
Batch 2022-2023	Semester II	Hours / Week 4	Total Hours 60	Credits 4

Course Objectives

1. To provide the students with a foundation in immunological processes
2. To understand the immune response made in humans to foreign antigens including microbial pathogens
3. To give the description of cells involved in the immune response as well to understand how the immune system recognizes self from non-self
4. To introduce the basic concepts of immuno diagnosis and therapy

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Define the role of the immune system
	CO2	Demonstrate the basic knowledge of the organization and function of the immune system
	CO3	Develop immunological concepts and methods to diagnose immune disorders
	CO4	Distinguish the mechanisms that lead to beneficial immune responses and immune disorders
	CO5	Apply the basics of immunotechnology in diagnosis and treatment

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT2CM		Core Practical 2- Lab in Molecular Biology and Genetics		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	II	6	70	3

Course Objectives

1. To enrich the students to have practical experience on molecular biology and Microbial genetics
2. To provide hands on experience in isolation of DNA, RNA and protein
3. To introduce basic microbial genetic experiments
4. To provide hands on experience in DNA and protein elution

Course Outcomes (CO)

After completion of the course, the students will be able to:

K3	CO1	Apply the technical skills involved in extraction, manipulation of biomolecules and quantification
↑	CO2	Understand the mechanisms of genetic exchange, mutations and their implications.
↕	CO3	Apply the practical skill for isolation of bacteria/plasmid DNA and its visualization in gel after separation by electrophoresis.
↓	CO4	Be competent in planning and execution of molecular genetic experiments
K5	CO5	Be capable of handling bacterial hosts and strains

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT2CN		Core Practical 3- Lab in Genetic Engineering and Immunotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	II	6	70	3

Course Objectives

1. To Acquire skills on techniques of construction of recombinant DNA - Cloning vectors and isolation of gene of interest
2. To have hands on experience in DNA manipulative enzymes
3. To give hands on experience in immunological techniques
4. To provide a basic understanding of labeling and detection techniques

Course Objectives (CO)

After completion of the course, the students will be able to:

K3 ↕ K5	CO1	Construct recombinant DNA molecule
	CO2	Understand the mechanisms of construction of genomic DNA library and cDNA Library
	CO3	Develop and apply the recent technology involved in diagnostic techniques of immunology
	CO4	Employ techniques like PCR for high end applications
	CO5	Plan and execute basic immunology experiments

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT308		Core Paper 08- Plant and Animal Transgenics		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	5	65	4

Course Objectives

1. To familiarize the students plant genetic engineering and gene transfer techniques
2. To discuss the concepts on gene knockout and hybridoma technology
3. To explain methods of various viruses mediated gene transfer methods and somatic cell nuclear transfer
4. Discuss ethical concerns over the use of animal and plant transgenics

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Explain various types of vector system and gene delivery methods in plants.
	CO2	Categorize biotic and abiotic profiles
	CO3	Investigate the importance of antisense and gene silencing in combating diseases.
	CO4	Discuss the applications of plant and animal transgenics in human welfare.
	CO5	Employ methods of culture and use of cell lines for varied applications

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT309		Core Paper 09- Industrial Applications of Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	5	70	4

Course Objectives

1. To acquaint students with technical and biological aspects of microbial utilization for production of metabolites
2. To study techniques for genetic improvements of microorganisms to improve yield of bioproducts.
3. To sensitize the students to basic bioreactor designs and uses
4. To expose to various biotechnological approaches for product production and recovery

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑ ↓ K5	CO1	Comprehend the role of industrial biotechnology in improving microbial cell as factories
	CO2	Design protocols for strain improvement and separation of molecules after fermentation process.
	CO3	Plan a research career or to work in the biotechnology industry with strong foundation about bioreactor design and scale up.
	CO4	Integrate research lab and industry, identify problems and seek practical solutions for large scale implementation of Biotechnology.
	CO5	Apply methods of production of bioproducts at an industrial scale

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT310		Core Paper 10 – Genomics, Proteomics and Metabolomics		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	4	60	4

Course Objectives

1. To develop a basic understanding of OMICS and their myriad applications
2. Exposure to the technical knowledge requirement for OMICS
3. To comprehend the fundamentals of genome and proteome data mining.
4. To promote study of human genome project to develop cures for human diseases with skills
5. To use complex algorithms, computer databases and software.

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Interpret genome proteome data obtained through high throughput techniques
	CO2	Analyse and identify sequence similarity with skills that can empower biologists to make use of their own data for understanding of biological processes
	CO3	Suggest and provide solutions to theoretical and experimental problems in Genomics , Proteomics and Metabolomics
	CO4	Apply the acquired knowledge for pharmacogenomics and comprehend the techniques for drug design
	CO5	Use genome proteome and Metabolome information on agri and health sector

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT3CO		Core Practical 4- Lab in Plant and Animal Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	6	70	4

Course Objectives

1. To make the students to be skilled in plant tissue culture techniques
2. To enhance the secondary metabolites through *in vitro* techniques
3. To equip the students with animal cell culture techniques
4. To provide a basic understanding of application of plant and animal culturing

Course Objectives (CO)

After completion of the course, the students will be able to:

K3 ↕ K5	CO1	Conserve the endangered species using *in vitro* culture techniques
	CO2	Perform tissue culture techniques can be useful for bioprospecting important natural compounds
	CO3	Employ *in vitro* animal cell culture techniques to evaluate the bioactive properties of samples
	CO4	Plan and execute commercial *in vitro* plant propagation
	CO5	Be competent in handling cell lines for various applications

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT3CP		Core Practical 5-Lab in Applied Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	6	70	3

Course Objectives

1. To impart hand-on experience and laboratory skills to students in area of bioprocess
2. To train students to set up different fermentation processes with special emphasis on the downstream processing of bio-molecules purification and characterization
3. To expose to basic Omics experiments and data analysis
4. To introduce basic concepts of herbal drug preparation

Course Outcomes (CO)

After completion of the course, the students will be able to:

K3 ↕ K5	CO1	Acquire General bacteriology and microbial techniques for isolation of pure cultures of microbes from different food, agricultural and environmental sources
	CO2	Downstream processing of the bio-molecules and characterization such as stability at different pH and Temperature
	CO3	Be compatible in basic methods of herbal drug preparation and testing
	CO4	Analyse protein and metabolite databases and infer
	CO5	Apply drug preparation methods for new product development

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT411		Core Paper 11- Pharmaceutical Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	III	5	65	4

Course Objectives

1. To expose the students to biopharmaceutical market
2. To give them the knowledge on drug development process.
3. To cover the latest developments in Pharmaceutical Biotechnology
4. To create an insight on drug interaction and clinical trials

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑	CO1	Apply the basic knowledge involved in drug preparation and the classical treatment processes
	CO2	Correlate the effects of drugs, bio-assay and interpretation
	CO3	take part in clinical research
	CO4	Have commendable research aptitude for drug designing
K5 ↓	CO5	Be appraised for job openings in the field of pharmaceuticals

Programme code: 08		Programme title: M.Sc., Biotechnology		
Course code: 22PBT1E1		Major Elective I - Environmental Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	5	65	5

Course Objectives

1. To introduce the students to various regional and global concerns regarding the environment, including the natural challenges, various types of environmental pollutants and their effects.
2. To Study the changing environment, and the developments of diverse technologies to detect, address these concerns.
3. To prioritize specific examples and cases, and explain how chemical, biological sciences can be applied to identify and address issues of environmental concerns.

Course outcomes

After completion of the course, the students will be able to:

K1	CO1	Recognise the various global and regional environmental concerns due to natural causes
	CO2	Investigate some examples of different types of environmental pollution and their impacts
	CO3	Demonstrate an awareness of emerging concerns such as climate change, waste management or reductions in fossil fuels, and new technologies for addressing these.
	CO4	Explain Environmental Impact Assessment, Management and Auditing in India
K5	C05	Evaluate the potential for biodegradation of organic pollutants, taking microbial and physical/chemical environments, as well as the chemical structure of the compound itself, into consideration

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT1E1		Major Elective 1-Nano Biotechnology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	5	65	5

Course Objectives

1. To understand the influence of dimensionality of the object at nanoscale on their properties
2. To outline size and shape-controlled synthesis of nanomaterials and their applications
3. To familiarize themselves with nanotechnology potentialities
4. To introduce the various applications of nanotechnology

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO 1	Understand the fundamentals of nanotechnology
	CO 2	Give a general introduction to different classes of nanomaterials
	CO 3	Apply their knowledge on various synthesis methods of nanomaterials
	CO 4	Understand characterization techniques involved in nanotechnology
	CO 5	Apply nanotechnological principles in agri and medical fields

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT1E1		Major Elective 1- Post Production System of Foods		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	I	5	65	5

Course Objectives

1. To focus on producing a high-quality product, maintaining the nutrition value of the food, increasing the shelf life of the product and availability of the seasonal fruits and vegetables throughout the year.
2. To impart knowledge and skills to deal with the technicalities and diverse issues with the food processing technologies.
3. To introduce a flavour of indigenous products
4. To sensitize on various packaging systems

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑↓ K5	CO1	Comprehend the basic principles and methods of food processing, reservation and quality.
	CO2	Predict processing and to find a method of preservation in relation to food composition.
	CO3	Discuss and employ quality standards ethics of processed foods.
	CO4	Invent and develop novel food by utilizing local resources of vegetation.
	CO5	Be competent in using local resources for entrepreneurship options

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT1E1		Major Elective 1-Plant therapeutics and phytoproducts		
Batch 2022-2023	Semester I	Hours / Week 5	Total Hours 65	Credits 5

Course Objectives

1. To understand the basics and applications of natural products
2. To comprehend the various phytomolecules in plant systems
3. To analyze and improve the standards and formulation of natural products in pharmaceutical industry
4. To study the role of natural products as nutraceuticals

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑ ↓ K5	CO1	Discuss the extraction methods of several natural products
	CO2	Illustrate the screening, isolation and characterization of phytocompounds
	CO3	Examine the mode of action of natural products in pharmaceutical and cosmetic industry
	CO4	Deploy the advanced methods for formulating drugs from natural origin
	CO5	Comprehend the regulatory aspects in plant therapeutics

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT2E2		Major Elective II -Research Methodology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	II	5	65	4

Course Objectives

1. To identify the overall process of designing a research study from its inception to its report.
2. To distinguish a purpose statement, a research question or hypothesis, and a research objective.
3. To describe and express the role and importance of research in basic and applied sciences
4. To Design an action plan of research and acquire skills of writing a research manuscript

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Evaluate literature, form a variety of sources, pertinent to the research objectives.
	CO2	Identify and justify the basic components of the research framework, relevant to the tackled research problem
	CO3	Raise awareness of crucial aspect of the nature of Knowledge and the value of scientific method
	CO4	Appreciate the components of scholarly writing and evaluate its quality
	CO5	Perform a standard and outcome based research in niche areas

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT2E2		Major Elective II- IPR, Biosafety and Bioethics		
Batch 2022-2023	Semester II	Hours / Week 5	Total Hours 65	Credits 4

Course Objectives

1. To disseminate fundamentals of Intellectual Property Rights to students
2. To impart the importance of IPR laws and to encourage students in the novel creation to meet the biotechnological demands.
3. To educate students about the principles and conflicts in bioethics
4. To perceive the various IPR convention and their utilities in biotechnology innovation.
5. To employ the basics of biosafety measures to maintain the biological integrity between the ecology and human health.

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1	CO1	Apply skills of critical thinking, reading, understanding, explaining and applying IP-related statutes and IP-related cases
↕	CO2	Analyse ethical and professional issues which arise in the intellectual property law context
	CO3	Apply intellectual property law principles (including copyright, patents, designs and trademarks) to real problems and analyze the social impact of intellectual property law and policy
K5	CO4	Facilitate the students to explore career options in IPR
	CO5	Be competent in evaluation of safety and ethical standards in biology

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT2E2		Major Elective II-Marine and Algal Biotechnology		
Batch 2022-2023	Semester II	Hours / Week 5	Total Hours 65	Credits 4

Course Objectives

1. To familiarize the students on marine natural products and its bioactive compounds
2. To provide insights on algal production and its importance.
3. To explain the applications of marine and algae in an environment and medicines.
4. To introduce various methods of applications of aquaculture

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Explain about the production of bioactive compounds and marine natural product.
	CO2	Investigate the application of Genetic Engineering in the marine science
	CO3	Describe importance of aquaculture Biotechnology
	C04	Explain about algal cultivation and its importance
	CO5	Employ methods of resource mobilization and usage for product production

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PB2TE2		Major Elective II – Total Quality Control and Management		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	II	5	65	4

Course Objective

1. To facilitate the understanding of Quality Management principles and process.
2. To understand the different components in management, customer - supplier relationship and services.
3. To learn the elements of quality systems and quality auditing.

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	To overview the basic knowledge of total quality management principles and concepts of Current Biotech Industries.
	CO2	To predict the customer orientated quality and leadership and continuous improvement process and supplier selection and management.
	CO3	To discuss six sigma concept methodology and application and the TQM tools.
	CO4	To invent and develop novel design of quality systems of ISO auditing in the field of Biotechnology.
	CO5	Apply TQM principles in biotechnology research and industry

Programme code: 08		Programme title: M.Sc. Biotechnology		
Course code: 22PBT3X1		Extra Departmental Course – Business ventures in Biosciences		
Batch 2022-2023	Semester III	Hours / Week 2	Total Hours 30	Credits 4

Course Objectives

1. Provides a more refined procedural road map for non-bioscience students who are interested in starting their own companies in bio sectors
2. To strengthen students‟ skills to commence their biotechnology company from its earliest stages to self-sustainable model
3. Provide students with a broad coverage of key areas of modern biotechnology and a basic understanding of business and finance issues.
4. Coupling of entrepreneurship with scientific innovation.

Course Outcomes (CO)

After completion of the course, the students will be able to:

K1 ↑ K5	CO1	Evaluate ideas and innovations that could be viable for a business
	CO2	Decipher and comprehend the ever changing scenario of Biotechnology industry
	CO3	Possess skills including idea evaluation, elevator pitching, intellectual property strategies, feasibility analysis, market assessments, regulatory approval, funding cycles, business planning, team formation, and financial planning
	CO4	Possess personal motivations in choosing potential next steps for commercialization
	CO5	Establish and sustain a bio business enterprise

Programme code: 08		Programme title: M.Sc., Biotechnology		
Course code: 22PBT3N1		Non Major Elective (on-line) - Aptitude and reasoning I		
Batch 2022-2023	Semester III	Hours / Week 2	Total Hours 27	Credits 4

Course Objectives

1. To introduce the concept of reasoning ability, research aptitude, and general awareness to the students.
2. To develop divergent thinking and motivate the students to participate in various competitive examinations
3. To prepare the students to face the challenges of the competitive exams
4. To train students by advancing, verbal and quantitative skills

Course outcomes

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	The ability to analyse a logical problem and to identify the appropriate resolving technique.
	CO2	The ability to use current skills, and tools necessary for Aptitude glitches.
	CO3	Students are asked to remember concepts in a short way.
	CO4	The ability to recognize the need for continuing professional development.
	C05	Increase in analytical nature to apply the scientific knowledge to arrive at the solution to the given scientific problem

Programme code: 08		Programme title: M.Sc., Biotechnology		
Course code: 22PBT3N2		Non Major Elective (on-line) - Core Domain Competitive Science		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	IV	2	27	4

Course Objectives

1. To introduce the concept of technical understanding of biotechnology & biology
2. To develop chance to learn each and every fact and detail regarding human beings, microbes, plants, and, animals.
3. To prepare the students to face the competitive exams with confidence

Course outcomes

After completion of the course, the students will be able to:

K1	CO1	Develop the knowledge of scientific concepts and/or application of the scientific concepts.
↕	CO2	Integrate the concept of system physiology in living organisms.
	CO3	Demonstrate the concept of Developmental biology
	CO4	Comprehend the Ecological principles for emerging concerns of environment
K5	C05	Succeed in competitive exams

Programme code: 08		Programme title: M.Sc., Biotechnology		
Course code: 22PBT3N2		Non Major Elective (on-line) – Cancer Biology		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	IV	2	30	4

Course Objectives

1. To introduce the overview and causes of cancer
2. To develop chance to learn molecular mechanism and cellular events in cancer progression
3. To understand the diagnostic procedure and treatment of cancer

Course outcomes

After completion of the course, the students will be able to:

K1	CO1	Develop the knowledge of causative agents of cancer
↕	CO2	Integrate the cellular events and signaling mechanism for cancer progression
	CO3	Comprehend the molecular basis for cancer
	CO4	Discuss the advanced diagnostics tools to detect the early onset of cancer
K5	C05	Invent and apply alternative strategies to treat cancer

Programme code: 08		Programme title: M.Sc., Biotechnology		
Course code: 22PBT3N2		Non Major Elective (on-line) – Nutraceuticals		
Batch	Semester	Hours / Week	Total Hours	Credits
2022-2023	IV	2	30	4

Course Objectives

1. To explain the nutraceutical concepts and classification and their role in human health
2. To understand the plant and animal origin and explain the health benefits of functional foods
3. To explain the importance of nutraceuticals in disease prevention

Course outcomes

After completion of the course, the students will be able to:

K1 ↕ K5	CO1	Develop the knowledge on relation of nutraceutical Science with other sciences
	CO2	Identify the different sources of nutraceuticals, their extraction methods, and their metabolism
	CO3	Discuss the concepts and extraction of marine and algal nutraceuticals
	CO4	Discover various food products that are used as nutraceuticals in making functional foods
	C05	Relate the role of various nutraceuticals in combating major health problems such as diabetes, obesity, cardiovascular diseases, cancer, and osteoporosis

Programme code: 08	Programme title: M.Sc. Biotechnology		
Course code : 22PBT0J1	JOC 1 - Plant tissue culture and Organic farming		
Batch 2022-2023	Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. To make students understand the applications of plant tissue culture
2. To give a detailed idea about the instruments used in plant tissue culture
3. To provide ideas on easy and low cost preparations of biomanures and biocontrol agents

Course Outcomes (CO)

K1 ↕ K5	CO1	Students are remembered with names the scientific names by spell repeatedly
	CO2	Outline the concepts by summarize to easy understanding
	CO3	Students trained to choose the correct method and solve the problem by applying the specific techniques
	CO4	Students made in to distinguish even small variations by simple analysis

Programme code: 08	Programme title: M. Sc. Biotechnology		
Course code : 22PBT0J2	JOC 2 - Herbal Biotechnology		
Batch 2022-2023	Hours / Week 2	Total Hours 30	Credits 2

Course Objectives

1. To enable the students to learn about the biochemical parameters used in the in the identification and utilization of medical plants
2. To enable the students to learn about the extraction of phytochemicals and to procedures
3. To exploit and explore the medicinal values of plants

Course Outcomes (CO)

On completion of the course, students will be able to

K1 ↑ ↓ K5	CO1	Recall the biosynthesis of primary and secondary metabolitesinvolved in plants
	CO2	Understand the concept of phyto-chemical extraction andprinciples involved in DNA and chemical fingerprinting techniques
	CO3	Understand about applications of phyto-constituent in development of drug
	CO4	The students can able to validate the results obtained using the techniques involved in photochemical analysis