

MAHENDRA ARTS & SCIENCE COLLEGE

(Autonomous)

Affiliated to Periyar University, Salem.

Accredited by NAAC with 'A' Grade & Recognized u/s 2(f) and 12(B) of the UGC Act 1956

Kalippatti – 637 501, Namakkal (Dt), Tamil Nadu.



DEPARTMENT OF BIOTECHNOLOGY

COURSE OUTCOMES (COs)

M.Sc. BIOTECHNOLOGY

PRINCIPAL

MAHENDRA ARTS & SCIENCE COLLEGE

(Autonomous)

Kalippatti (PO) - 637 501, Namakkal (DT)

**For the students
admitted from the
Academic Year 2019-2020 onwards**

SEMESTER I

Core - I	M.Sc., Biotechnology	2019-2020
Code : M19PBT01	CELL BIOLOGY	
Credits: 4		

Objective

To provide information about cells, including their composition, function and cell-cycle checkpoints.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the fundamental principles cellular biology	K1
CO2	Understand the cell, cell cycle and Cell signaling	K2
CO3	Understand the cellular components underlying mitotic and meiotic cell division.	K2
CO4	Give the ideas about cell organelles	K3
CO5	Discuss the Understand the development of model organisms and stem cell types, uses in tissue repair	K2

SEMESTER I

Core - II	M.Sc. Biotechnology	2019 - 2020
Code: M19PBT02	BIOLOGICAL CHEMISTRY	
Credit: 4		

Objective

To provide knowledge about biomolecules classification, synthesis, metabolism and their role in living cells.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Impart knowledge about acid, bases, buffers, pH and thermodynamic principles	K3
CO2	Make knowledge about carbohydrate and lipid classification and its metabolism	K2
CO3	Impart knowledge of amino acid, protein structure and classification	K3
CO4	Make Knowledge about secondary metabolites of living organism Understand the basic principles of nucleotide metabolism	K3
CO5	Understand the basic principles of hormones function and the impact of vitamin and minerals in human health	K4

SEMESTER I

Core - III	M.Sc Biotechnology	2019-2020
Code : M19PBT03	MOLECULAR BIOLOGY	
Credit : 4		

Objective

To provide detailed idea about gene organization and expression of prokaryotic and eukaryotic organisms.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the basic concept of molecular biology and mechanism of nucleotide	K2
CO2	Describes the detailed knowledge about prokaryotic and eukaryotic transcription and its regulatory mechanism	K2
CO3	Describes the detailed knowledge about prokaryotic and eukaryotic translation with the protein synthesis and localization	K3
CO4	To understand the oncogene expression and its structure and function	K3
CO5	To understand the molecular markers and its various applications.	K3

SEMESTER I

Core - IV	M.Sc. Biotechnology	2019 - 2020
Code : M19PBT04	MICROBIOLOGY	
Credit: 4		

Objective

To understand better knowledge about history of microbiology and development, medical microbiology and genetic mutations.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the history, development and Visualization using different microscopy study	K1
CO2	Understand the microbial growth regulation and cultivation of microbes.	K2
CO3	Understand the physiological parameters required for the microbial growth.	K3
CO4	Describes the microbial infections to the animals and human	K3
CO5	Describes the details of the microbial genetics-Mutations, transformations and viral life cycle	K3

SEMESTER I
Elective

Elective - I	M.Sc., Biotechnology	2019-2020
Code: M19PBTE01	BIOPHYSICS AND BIOINSTRUMENTATION	
Credits : 3		

Objective

To introduce fundamental concepts of biophysics and to focus on the bioanalytical techniques.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understanding various structure, types and stability of proteins and nucleic acids	K1
CO2	Understand the basic principles and maintains of spectral analysis like UV, FT-IR, MALDI-TOF.	K2
CO3	Make knowledgeable and learn about different centrifugation and electrophoresis techniques	K3
CO4	Impart knowledge about different chromatographic techniques	K4
CO5	Understand about different imaging techniques and its application	K3

SEMESTER I

Elective - I	M.Sc., Biotechnology	2019 - 2020
Code: M19PBTE02	SOIL SCIENCE	
Credit: 3		

Objective

To impart basic knowledge about soil physical properties and processes in relation to plant growth.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand composition, phase system, texture, properties and mineralogical composition of soil.	K2
CO2	Knowledge and understanding of the soil structure, classification, soil aggregation, factors influencing the soil structure and plant growth	K2
CO3	Impart knowledge of factors influencing Soil consistency, Cohesion, Adhesion, Soil moisture, Forms of soil water, and water energy concept	K4
CO4	Understand the knowledge about Water flow in saturated and unsaturated soil and Soil Moisture Characteristic Curve	K3
CO5	Knowledge about soil air composition, thermal property and plant growth system.	K4

SEMESTER I

Elective - I	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTE03	HUMAN PHYSIOLOGY	
Credit: 3		

Objective

To provide the knowledge about structure and functions of different anatomical features relating to human physiology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand composition and functions of different blood components	K2
CO2	Make knowledgeable about role of human digestive system in digestion and absorption of food	K3
CO3	Impart knowledge of central nervous system and molecular signaling mechanism of hormones.	K4
CO4	Learn about human circulatory system	K4
CO5	Make knowledge about role of kidney in human excretory system	K3

SEMESTER-I

Elective - I	M.Sc., Biotechnology	2019 - 2020
Code : M19PBTE04	HORTICULTURE	
Credit: 3		

Objective

To emphasis on development of entrepreneurial potential and skills amongst the students in horticulture.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the classification, importance and nutritional requirements of horticulture crops	K2
CO2	Knowledge about plant propagation methods, plant regulators uses.	K2
CO3	Impart knowledge of garden design, types and maintenance.	K4
CO4	Make knowledgeable and learn about floriculture and cultivation of commercial flowers and fruits.	K3
CO5	Understand basic concepts about green house, indoor gardening and its maintenance.	K4

SEMESTER I

Core Practical - I	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTP01	PRACTICAL - I - CELL BIOLOGY AND BIOLOGICAL CHEMISTRY	
Credit: 4		

Objective

To provide practical knowledge on techniques involved in cell biology and biological chemistry.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know about microscope, cell size and its measurements and tissue sectioning using microtomy	K1
CO2	Understand mitosis and meiosis, mounting of giant chromosomes, to prepare permanent slide using DPX and determine the sex chromatin of living cells	K2
CO3	Learn to calibrate pH meter, buffer preparation	K2
CO4	Quantitatively measure the amount of glucose, DNA, RNA, protein, starch, carbohydrate and amino acid	K4
CO5	Separate amino acid by paper and thin layer chromatography and protein purification using polyacrylamide gel electrophoresis	K4

SEMESTER I

Core Practical – II	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTP02	PRACTICAL - II - MICROBIOLOGY AND	
Credit: 4	MOLECULAR BIOLOGY	

Objective

To acquire skills and competency in microbiological and molecular biological laboratory practices applicable to research or clinical methods, including accurately reporting observations and analysis.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
MICROBIOLOGY		
CO1	Learn sterilization techniques, media preparation, pure culture technique cultural characteristics, staining techniques and preservation of microbes	K1
CO2	Analyze biochemical characterization of Bacteria – Catalase test, oxidase test, Sugar fermentation, IMVIC, urease test, TSI test, Starch hydrolysis	K4
CO3	Perform antibiotic sensitivity test and measurement and stages of bacterial growth. Determination of potability of water by MPN method	K4
CO4	Induce Mutagenesis (UV, NTG & EMS)	K3
CO5	Isolate and detection single cell colony for antibiotic resistant bacteria, markers	K4

SEMESTER II

Core - V	M.Sc., Biotechnology	2019 - 2020
Code : M19PBT05	GENETIC ENGINEERING AND rDNA TECHNOLOGY	
Credit: 4		

Objective

To impart the versatile tools and techniques employed in genetic engineering and recombinant DNA technology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the application of molecular enzymes	K1
CO2	Understand the concepts of vectors and its database	K2
CO3	To learn the gene cloning methods in theory and practice	K3
CO4	To learn the concepts of cloning strategy	K3
CO5	To learn genetic engineering of living organism for human benefit	K3

SEMESTER II

Core - VI	M.Sc. Biotechnology	2019 - 2020
Code: M19PBT06	IMMUNOLOGY AND IMMUNOTECHNOLOGY	
Credit: 4		

Objective

To impart the principles and applications of immunology and immunotechnology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the infection, immunity and immune system of living things	K1
CO2	To understand the various types of antigens and its characterization.	K2
CO3	To know about the antigen and antibody interaction and some practical approaches.	K3
CO4	To understand the concept of hypersensitivity and also the autoimmunity	K3
CO5	Give the sound knowledge about immunological techniques and immune diagnosis.	K3

SEMESTER II

Core - VII	M.Sc. Biotechnology	2019 - 2020
Code: M19PBT07	BIOPROCESS TECHNOLOGY	
Credit: 4		

Objectives

To provide insight knowledge on wide-ranging topics related to bioprocess technology and its applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the techniques for the isolation of microorganisms from the various sources.	K3
CO2	Describes the methodology of storage and maintenance of the microorganisms	K3
CO3	To understand the downstream and downstream process of the microbial production	K4
CO4	To understand the basic techniques and operating system of the instrument for the bioprocess technology	K3
CO5	Describes the concept of downstream process	K2

SEMESTER II

Elective

Elective - II	M.Sc., Biotechnology	2019 - 2020
Code: M19PBTE05	CANCER BIOLOGY	
Credit: 3		

Objectives

To provide an in-depth idea about molecular and cellular basis of cancer cells and emphasize the biology of cancer.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the regulation, signal of cell cycle, cell cycle in cancer	K2
CO2	Knowledge and understanding history, principle, metabolism of Carcinogenesis	K2
CO3	Impart knowledge Identification, detection of Oncogenes and growth factors related transformations.	K4
CO4	Understand the knowledge about tumour cell invasion, membrane disruptions and clinical significance.	K3
CO5	Knowledge about advanced detection of cancer and its different forms of therapy	K4

SEMESTER III

Elective - VI	M.Sc. Biotechnology	2019 - 2020
Code M19PBTE06	ENZYME AND ENZYME TECHNOLOGY	
Credit: 3		

Objectives

To provide a deeper insight into the fundamental and functional aspects of enzymology with biocatalysis, molecular modeling, structural biology and diagnostics.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the basic knowledge about Enzymes and its types	K1
CO2	Understand the concept of enzyme substrate interaction and their mechanisms	K2
CO3	Describe the details of various pathway of regulations of the enzymes.	K2
CO4	Understand the concept of physical parameters of enzymes.	K2
CO5	Describes the application of the enzymes in industrial and product development	K3

SEMESTER II

ELECTIVE- II	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTE07	CLINICAL BIOCHEMISTRY	
Credit: 3		

Objective

To provide the knowledge about various metabolic diseases linked with biochemical parameters and their clinical manifestations.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand types of carbohydrate and lipid metabolic disorders	K1
CO2	Make knowledgeable about amino acid and nucleic acid disorders	K2
CO3	Impart knowledge on different disorders associated with circulatory, respiratory digestive system of human	K4
CO4	Understand hormonal disturbances and mineral metabolic disorders	K3
CO5	Learn about disorders related to blood, enzyme and detoxification mechanism of human body	K3

SEMESTER II

Elective- II	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTE08	AQUACULTURE	
Credit: 3		

Objective

To provide the knowledge about aquaculture and its applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand to setup the fish farms.	K1
CO2	Impart knowledge on identification of various types of aquaculture strategies.	K2
CO3	Provide knowledge seed culture development and cultivation.	K4
CO4	Understand about nutritional requirements and feed formulation to various crops.	K3
CO5	Provide knowledge about other economic important varieties in aquaculture.	K3

SEMESTER II

Core Practical- III	M.Sc. Biotechnology	2019 - 2020
Code : M19PBTP03	PRACTICAL - III - GENETIC ENGINEERING AND rDNA TECHNOLOGY	
Credit: 4		

Objective

To provide hands on training of versatile techniques employed in genetic engineering and recombinant DNA technology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Isolate genomic DNA, plasmid DNA and Phage DNA. Gain the knowledge about replica plating, Learn about bacteriophage Life cycle	K2
CO2	Quantify nucleic acid, protein content of sample	K2
CO3	Know about bacterial transformation, conjugation mechanism	K3
CO4	Understand the procedure of restriction, ligation, principle to amplify DNA sequence using PCR	K4
CO5	RFLP and RAPD	K1

SEMESTER II

Core Practical - IV	M.Sc. Biotechnology	2019 - 2020
Code : M19PBTP04	Practical - IV - IMMUNOLOGY AND BIOPROCESS TECHNOLOGY	
Credit: 4		

Objective

To provide the practical knowledge about techniques involved in immunology and bioprocess technology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Understand the separation of serum & plasma from the human blood samples and differential count of white blood cells	K1
CO2	Expertise to test, blood grouping, typhoid fever, antistreptolysin O (ASO) of group A <i>Streptococcus</i> infection. rheumatoid arthritis (RA) factor, pregnancy test from urine sample, rapid plasma reagin test to screen syphilis, various types of precipitation and agglutination reaction and measure antibodies, antigens, proteins and glycoproteins	K4
CO3	Knowing to antiserum development form laboratory animals	K4
CO4	Understand the technique for the isolation of Amylase antibiotic producing microbes, Culture optimization	K1
CO5	Produce industrial important products (amylase, protease, Antibiotics, citric acid, alcohol by submerged and solid state fermentation techniques.	K4

SEMESTER II

Enhancement Compulsory Course	M.Sc. Biotechnology	2019 - 2020
Code: M19PHR01	HUMAN RIGHTS	
Credit: 2		

Objective

To present the different aspects of human and also to make the students to understand the duties to be carried out in the days to come.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Remember the need and types of Human rights	K1
CO2	Understand the Classification of Human Rights	K2
CO3	Apply the Rights of Women and Children	K4
CO4	Learn the Rights of Labour	K2
CO5	Analyze the National and State level human Rights Commission	K3

SEMESTER III

Core - VIII	M.Sc. Biotechnology	2019 - 2020
Code :M19PBT08	PLANT BIOTECHNOLOGY	
Credit: 4		

Objective

To focus on classical and modern plant biotechnology processes and their applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the concept of plant tissue culture, media preparation.	K1
CO2	Understand the sterilization techniques, somatic embryogenesis.	K2
CO3	Understand the concept protoplast isolation, somoclonal variation and secondary metabolites.	K3
CO4	Develop a deep understanding gene transfer technique, plant pathogen interaction and terminator seed concept.	K3
CO5	Understand the plant breeding, cryopreservation techniques, etc.	K3

SEMESTER III

Core - IX	M.Sc., Biotechnology	2019-2021
Code: M19PBT09	ANIMAL BIOTECHNOLOGY	
Credits : 4		

Objective

To focus on the basic principles of animal cell culture, its commercial production and applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the fundamental principles of <i>In vitro</i> fertilization techniques	K1 & K2
CO2	Understand the Basic requirements of Animal cell culture	K2
CO3	Understand the basic gene transfer methods employed for animal cells	K2
CO4	Develop a deeper understanding and application of molecular techniques involved in animal cell culture	K1
CO5	Understand the production and recovery of products from transgenic animals	K2

SEMESTER III

Core - X	M.Sc. Biotechnology	2019 - 2020
Code : M19PBT10	ENVIRONMENT BIOTECHNOLOGY AND	
Credit: 4	NANOTECHNOLOGY	

Objective

To provide an insight into the fundamentals and applications of environmental biotechnology and Nanotechnology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the basic concept of air pollution and greenhouse effect	K1
CO2	Understand the concept of water pollution and waste water treatment	K1
CO3	Describe the necessity of degradation of inorganic wastes and degradation of xenobiotics	K2
CO4	Understand the basic knowledge nanotechnology and nanomaterials	K2
CO5	Understand the importance of nano sensors and drug delivery systems.	K3

SEMESTER III

Core - XI	M.Sc. Biotechnology	2019 - 2020
Code : M19PBT11	PROTEOMICS AND GENOMICS	
Credit: 4		

Objective

To appraise the students to basic and high throughput techniques in Genomics and Proteomics and their applications.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	To understand the concept of sequencing techniques and molecular based techniques.	K1
CO2	To understand the various types of polymerase techniques, this is applicable in the field of diagnostic purposes.	K3
CO3	Describe the detailed information about the gene expression	K2
CO4	Application of the biological based tools for the protein and nucleotides.	K3
CO5	To understand the concept of separation techniques for the protein molecules.	K3

SEMESTER III

Elective

Elective - III	M.Sc., Biotechnology	2019-2020
Code: M19PBTE09	BIostatistics	
Credits : 3		

Objective

To understand the present up-to-date theory and techniques of statistical inference (estimation theory) in a logically integrated and practical form.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know the correlation and methods of correlation	K1
CO2	Learn the basic concepts of inferential statistics	K2
CO3	Obtain the testing of hypothesis using statistical data	K3
CO4	Analyze the statistical data using single means and difference of mean	K4
CO5	Analyze data using the chi square test	K4

SEMESTER III

Elective - III	M.Sc., Biotechnology	2019-2020
Code: M19PBTE10	MARINE BIOTECHNOLOGY	
Credits : 3		

Objective

To provide insight knowledge of marine biodiversity, its products, applications and its conservations.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the fundamentals of oceans and seas, abiotic and biotic factors	K1 & K2
CO2	Understand the importance of marine biological diversity and role of phytoplankton, deep sea adaptation	K2
CO3	Identify the Marine bioactive compounds and organisms involved in the production of bioactive compounds	K2
CO4	Develop a deeper understanding and application of anti-cancer, anti-viral, anti-fungal, herbicides and biopesticides	K2
CO5	Understand the concept of marine conservation, factors creating diversity, protected areas and risk factors	K3

SEMESTER - III

Elective - III	M.Sc. Biotechnology	2019 - 2020
Code : M19PBTE11	STEM CELL BIOLOGY AND TISSUE	
Credit: 3	ENGINEERING	

Objective

To enable students to understand the principles, techniques and applications of stem cells and tissue engineering.

Course Outcomes

By the end of the course, the student should be able

CO Number	CO Statement	Knowledge Level
CO1	Describe the fundamental characteristics, properties and classification of stem cells	K2
CO2	To understand the potency, specification, differentiation of stem cells in model organisms, cell signaling in control pathways and checkpoints	K1
CO3	To provide the detailed knowledge of gene expression and stem cell communication. To understand the stem cell regeneration in various organs, tissues and stem cell disease, disorders	K3
CO4	Describe the principles of tissue culture, tissue engineering. It provides the knowledge of synthesis of organ and tissues in invitro and in vivo and its regulations	K3
CO5	To understand the transplantation techniques, bio artificial. Bio printing of tissues and organs.	K3

SEMESTER III

Elective - III	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTE12	APICULTURE	
Credit: 3		

Objective

To emphasis on development of entrepreneurial potential and skills amongst the students in apiculture.

Course Outcomes

After completing this course, students will be able to:

CO Number	CO Statement	Knowledge Level
CO1	Understand about the taxonomy, Bio-ecology and life history of honey bee.	K1
CO2	Gain the knowledge about bee colony, types and structure of bee hives.	K2
CO3	Learn the skills about apiary care and management.	K2
CO4	Gain the knowledge about Honey composition, bee wax and its uses and also explore the diseases of honey bees and their control methods	K2
CO5	Understanding the self employment and business enterprises of apiculture.	K3

SEMESTER III

Core Practical-V	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTP05	PRACTICAL - V - PLANT AND ANIMAL BIOTECHNOLOGY	
Credit: 4		

Objective

To provide hands on training in the field of plant and animal biotechnology.

Course Outcomes

By the end of the course, the student should be able to:

CO Number	CO Statement	Knowledge Level
Plant Biotechnology		
CO1	Understand media preparation, Sterilization Techniques for animal and plant tissue culture techniques.	K2
CO2	Perform organ cultures, Callus propagation, organogenesis, transfer of plants, hardening process, Protoplast isolation and Anther and pollen cultures	K4
CO3	Learn about gene transfer technique	K1
CO4	Prepare single cell suspension from spleen and thymus	K3
CO5	Know the technique of Cell counting and cell viability, Trypsinization of monolayer and sub-culturing, Embryonated Egg inoculation and Preparation of chick embryo fibroblast culture (monolayer	K4

SEMESTER III

Core Practical-VI	M.Sc. Biotechnology	2019 - 2020
Code: M19PBTP06	PRACTICAL -VI - ENVIRONMENTAL BIOTECHNOLOGY, PROTEOMICS AND GENOMICS	
Credit: 4		

Objective

To provide hands on training in environmental biotechnology, proteomics and genomics.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Determine dissolved sulphate, residual chlorine, silicate and BOD in water	K2
CO4	Perform the effect of heavy metal toxicity on behavioral changes in fish and Impact of heavy metal on oxygen consumption of fresh water fish	K4
CO7	ORF-Predict and Genome Annotation- GEN SCAN	K3
CO9	Protein Secondary and Tertiary structure analysis- EXPASY Tools	K3
CO10	Molecular Docking	K2

SEMESTER IV

Core -XII	M.Sc., Biotechnology	2019-2021
Code: M19PBT12	RESEARCH METHODOLOGY AND RESEARCH PROPOSAL DEVELOPMENT	
Credits : 4		

Objective

To develop a research orientated approach among the students and to acquaint them with fundamentals of research methods.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Describe the fundamental research; Definitions, characteristics, types of research, topic selection and problem identification	K1 & K2
CO2	Understand the Literature review, Source of information, Organization of information on index cards. Objectives Formulation of the research objectives.	K2
CO3	Understand the basic Research methodology, Sampling, Plan and Methods of for data collection, Ethical considerations	K3
CO4	Develop a deeper understanding the work Plan, Major components and outline of research, Summary, Research report and proposal writing	K3
CO5	Understand the concept of measures of Mean, Analysis of Variance and use of bioinformatics tools	K3 & K4

SEMESTER II

Extra Disciplinary Course

EDC - I	M.Sc., Biotechnology	2019 - 2020
Code: M19EBT01	AGROBIOTECHNOLOGY	
Credit: 4		

Objective

To emphasis on development of entrepreneurial potential and skills amongst the students in agricultural biotechnology.

Course Outcomes

On the successful completion of the course, students will be able to

CO Number	CO Statement	Knowledge Level
CO1	Impart knowledge of types of earthworm, Vermicompost production method and its nutrient values	K2
CO2	Understand the knowledge of biofertilizer production and its uses.	K2
CO3	Make knowledgeable and learn about chemical fertilizers of merits and demerits	K4
CO4	Understand the significance of management of pests and diseases.	K3
CO5	Knowledge about farm implementation, economic importance of vermicomposting.	K4

SEMESTER II

EDC-II	M.Sc. Biotechnology	2019 - 2020
Code: M19EBT02	HEALTH CARE AND ENVIRONMENTAL	
Credit: 4	BIOTECHNOLOGY	

Objective

To make the students understand public health and keep healthy environment.

Course Outcomes

On the successful completion of the course, students will be able to

CO	Statement	Knowledge Level
CO1	Understand the Public Health	K1
CO2	Understand the concepts of Epidemiology	K2
CO3	Important environmental issues and protection	K3
CO4	Describe the use of biotechnological processes to protect the environment	K3
CO5	Understand the principle of industrial waste management	K3


Head of the Department
HEAD OF THE DEPARTMENT

Department of Biotechnology,
Mahendra Arts & Science College (Autonomous),
Kalippatti (Po) - 637 501. Tiruchengode (Tk),
Namakkal (Dt). Tamil Nadu, India.


PRINCIPAL
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Principal

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DEPARTMENT OF BIOTECHNOLOGY

PROGRAMME OUTCOMES (POs) OF M.Sc. BIOTECHNOLOGY

Academic year 2020-2021

PO1: Post Graduates will gain successful career in the field of Biotechnology and allied industries.

PO2: Post Graduates will have professional competency to address the technological needs of society and industrial problems ethically.

PO3: Post Graduates will excel in research and contribute to Biotechnological product development.

PO4: Post Graduates will exhibit project management skills and ability to work in collaborative, multidisciplinary tasks in their profession.


Head of the Department

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DEPARTMENT OF BIOTECHNOLOGY

PROGRAMME SPECIFIC OUTCOMES (PSOs) OF M.Sc. BIOTECHNOLOGY

Academic year 2020-2021

PSO1: Apply knowledge of various research fields of Life Sciences and the biotechnology in the following specific area cell Biology, biological chemistry, Genetic Engineering and rDNA Technology, microbiology, biophysics, genetics and molecular biology, bioinformatics, Immunology and Immuno-technology, bioprocess technology, plant and animal biotechnology, environmental biotechnology, Nano biotechnology, etc.

PSO2: Use fundamental research skills and knowledge in the experimental strategies for analysis and interpretation of data in scientific manner and adopt code of ethics in professional and social context and legal behaviors in decision making.

PSO3: Understand the biological principles and knowledge for applying to the societal and environmental issues and find out the solutions to need sustainable development.

PSO4: Develop skills, attitude and values from outcome based core, elective and extra disciplinary courses required for self-directed, lifelong learning, build-up a progressive and successful career in biotechnology also demonstrate ability in careers domain like Pharmaceutical, Food Industry, manufacturing facility , medical coding, etc.


Head of the Department

HEAD OF THE DEPARTMENT

Department of Biotechnology,
Mahendra Arts & Science College (Autonomous),
Kalippatti (Po) - 637 501, Tiruchengode (Tk),
Namakkal (Dt), Tamil Nadu, India.


Principal

PRINCIPAL

MAHENDRA ARTS & SCIENCE COLLEGE
(Autonomous)


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MAHENDRA ARTS & SCIENCE COLLEGE
(Autonomous)

Kalippatti (PO) - 637 501, Namakkal (Dt)
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