M E S COLLEGE OF ARTS, COMMERCE AND SCIENCE

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A booklet on Course Outcome

An IQAC Initiative

2022 – 2023

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BIOTECHNOLOGY		
Paper	**Course Name**	**Course outcome**
DSC-TlBTClOl	**CELL BIOLOGY AND GENETICS**	At the end of the course the student should be able to • Understand concepts in Biotechnology and demonstrate knowledge acquired m interdisciplinary skills in cell biology and genetics • Comprehend the structure of a cell with its organelles • Understand the chromatin structure and its location • Understand the basic principles of life, and how a cell divides • Explain the organization of genes and chromosomes, chromosome morphology and its aberrations
DSC-T2BTC102	**MICROBIOLOGICAL METHODS**	
DCS -3T	**BIOMOLECULES**	At the end of the course the student should be able to: • Acquire knowledge about types of biomolecules, structure, and their functions • Will be able to demonstrate the skills to perform bio analytical techniques • Apply comprehensive innovations and skills of biomolecules to biotechnology field
DCS -4T	**MOLECULARBIOLOGY**	At the end of the course the student should be able to • Study the advancements in molecular biology with latest trends. • Will acquire the knowledge of structure, functional relationship of protein sand nucleic acids. • Aware about the basic cellular processes such as transcription, translation ,DNA replication and repair mechanisms.
BTT 501	**GENETIC ENGINEERING AND EBT**	Students learn about genetic engineering and its application in the field of agriculture and medicine ▪ They learn to obtain gene rom the source and ligating it to the vector and transforming to a host cell to get the desired product ▪ DNA finger printing ▪ Biogas production, renewable and non-renewable resources ▪ Microbial production of H_2, ethyl alcohol ▪ GM organisms and its application in bioremediation Importance of N_2 fixing organisms and its production in large scale as biofertillizers, which helps in increasing the percentage of crop.
BTP 502	**GENETIC ENGINEERING AND EBT**	Research institute important basic techniques: ▪ DNA AND RNA isolation from plant and animal source ▪ Plasmid DNA isolation from E. coli ▪ Gel electrophoresis technique to separate DNA ▪ Protein separation technique by SDS PAGE Examination of bacteria in water
		Students learn about: ▪ Different types of immunity- innate, adaptive, cell mediated, humoral, active and passive

BTT 601	**IMMUNOLOGY AND ABT**	▪ Antigens and its properties ▪ Antibodies, different types, properties and functions ▪ Production of antibodies ▪ Blood typing ▪ Complement system ▪ Hypersensitivity reactions in humans ▪ Animal tissue culture ▪ Types of media used for ATC ▪ Growth hormones – EGF, FGF, PDGF, IL-1 &2, NGF, Erythropoeitin ▪ Techniques of disaggregation of animal tissue, primary and secondary culture ▪ Cell lines, examples and transformation of animal cell lines ▪ HAT selection, selectable markers, expression vectors , over production o and downstream processing of expressed proteins ▪ Transgenic animals and applications ▪ Monoclonal antibodies and applications Production of vaccines
BTP 602	**IMMUNOLOGY AND ABT**	Pathologically important techniques: ▪ Blood grouping and WBC counting ▪ Diagnosis of typhoid and syphillis by WIDAL and VDRL METHOD ▪ ELISA techniques applicable to diagnose various virus and bacteria like dengue : DOT ELISA and Sandwich ELISA ▪ Finding concentration of antigen in serum by rocket immune electrophoresis technique ▪ Finding identity of two antigens by ouchterlony double diffusion technique Serum separation from blood and serum precipitation technique
BTT 701	**PLANT BIOTECHNOLOGY**	Students learn about plant hormones ▪ Sterilization techniques ▪ Plant growth media ▪ Micro propagation techniques ▪ Primary and secondary metabolites ▪ Organ culture – ovary, ovule, anther, embryo and endosperm ▪ Somatic embryogenesis and somatic hybridization ▪ Transgenic plants and technique s of transformation ▪ Role of tissue culture in agriculture. Horticulture and forestry Intellectual property rights
BTP 702	**PLANT BIOTECHNOLOGY**	Students learn the technique of: ▪ Plant tissue culture media ▪ Plants organ culture – callus, shoot tip, anther, nodal, , suspension culture ▪ Preparation of industrially important synthetic seeds Isolation of protoplast for creating cybrids
		Students learn about : ▪ Fermenters ▪ Techniques of fermentation ▪ Downstream processing of fermented products ▪ Methods of strain improvement ▪ Upstream processing before fermentation

BTT 801	**INDUSTRIAL BIOTECHNOLOGY**	▪ Production of microbial products – alcohol, organic compounds, antibiotic, aminoacids, Vitamin b12 ▪ Enzyme technology and its application ▪ Fermented food products – SCP and SCO Mass culture of spirullina, production of xanthum gum, saffranin, capascin, PHA and PHB
BTP 802	**INDUSTRIAL BIOTECHNOLOGY**	Students learn industrially important basic techniques: ▪ Algal and fungal culture for mushroom, vitamins, antibiotic and acid production ▪ Estimation of acid and sugar ▪ Cell immobilization techniques ▪ Alcohol estimation by specific gravity method Industrial visits to various industries

BOTANY

Paper	Course Name	Course outcome
PAPER 1	**MICROBIAL DIVERSITY AND TECHNOLOGY**	• Understand the fascinating diversity, evolution, and significance of microorganisms. • Comprehend the systematic position, structure, physiology and life cycles of microbes and their impact on humans and environment. • Gain laboratory skills such as microscopy, microbial cultures, staining, identification, preservation of microbes for their applications in research and industry.
PAPER 2	**DIVERSITY OF NON-FLOWERING PLANTS**	• Understand the diversity and affinities among Algae, Bryophytes, Pteridophytes and Gymnosperms. • Understand the morphology, anatomy, reproduction and life cycle across Algae, Bryophytes, Pteridophytes and Gymnosperms, and their ecological and evolutionary significance. • Obtain laboratory skills/explore non-flowering plants for their commercial applications.
BOT-A-3.1	**PLANT ANATOMY AND DEVELOPMENTAL BIOLOGY**	The students will be able to: • Observation of variations that exist in internal structure of various parts of a plant and as well as among different plant groups in support for the evolutionary concept. • Skill development for the proper description of internal structure using botanical terms, their identification and further classification. • Induction of the enthusiasm on internal structure of locally available plants. • Understanding various levels of organization in a plant body with an outlook in the relationship between the structure and function through comparative studies. • Observation and classification of the floral variations from the premises of college and house. • Understanding the various reproductive methods sub-stages in the life cycle of plants • Observation and classification of the embryological variations in angiosperms. • Enthusiasm to understand evolution based on the variations in reproduction among plants.
BOT-A-4.1	**ECOLOGY AND CONSERVATION BIOLOGY**	The students will be able to: • Understanding the fundamental concepts in ecology, environmental science and phytogeography. • Concept development in conservation, global ecological crisis, Sustainable development and pros and cons of human intervention. • Enable the student to appreciate bio diversity and the importance of various conservation strategies, laws and regulatory authorities and global issues related to climate change and sustainable development.

PAPER 5	**TAXONOMY AND ECONOMIC BOTANY**	Students Learn ▪ Structure and modification of root, stem and leaf ▪ Morphological features of inflorescence, flower and fruit. ▪ Identification and characterization of plants based on the taxonomic characters and assign them to the respective families ▪ Use of technical terms for describing plants ▪ Use of ICBN rules ▪ Herbarium techniques ▪ How to study local flora Economic importance of different parts of plants and their significance
PAPER 6	**MOLECULAR BIOLOGY, GENETIC ENGINEERING, BIOTECHNOLOGY, AND PLANT PHYSIOLOGY**	Students Learn ▪ Quantitative analysis of starch, proteins, Reducing sugars and Lipids ▪ Determination of osmotic potential of cell sap by plasmolytic method ▪ Determination of Stomatal Index ▪ Streaming of protoplasm to show cyclosis ▪ Study of Osmosis and transpiration experiments Study of phloem transport by ringing Experiments
PAPER 7	**CYTOLOGY, GENETICS, EVOLUTION AND PLANT BREEDING**	Students Learn ▪ Preparation of cytological stains ▪ Preparation of permanent slides of mitosis and meiosis using plant material Allium root tips and flowers ▪ Karyotype and Ideogram: Camera Lucida Drawing ▪ Plant Breeding Techniques Solve plant Genetic Problems
PAPER 8	**PLANT PHYSIOLOGY III**	▪ Defense mechanisms in plants Students learn ▪ Separation of photosynthetic pigments by paper chromatography and measure of Rf values ▪ Determination of rate of photosynthesis at different wavelength of light ▪ Determination of rate of photosynthesis at different concentration of CO2 ▪ Estimation of Ascorbic Acid content in plant sample ▪ Determination of RQ of carbohydrates, fats and proteins ▪ Determination of rate of growth in plants using ArC Auxanometer Study of manufacture of Alcohol/ Antibiotics/Enzymes at Industrial level by visit to any one of the Industry