PROGRAMME OUTCOMES of B.Sc (Life Sciences)

PO1	Gain academic expertise and critical thinking capability in the field of their study.
PO2	Analyze data meticulously and draw logical, physical inferences out of it.
PO3	Develop scientific temper and research aptitude through experiential learning.
PO4	Apply the concepts in key areas of science and allied subjects there by enhancing their employability and entrepreneurship skills.
PO5	Develop critical and analytical skills in the identification and resolution of problems within complex changing socio-economic environments.
PO6	Display skills in ethical analysis and decision-making with empathy and respect for core human values.
PO7	Become a responsible citizen who cultivates human values for the formation of an egalitarian society.
PO8	Ability to incorporate lifelong learning and commit to Professional Ethics

PROGRAMME SPECIFIC OUTCOMES OF B.Sc. BTBC

PSO1	Graduates will have a comprehensive understanding of the fundamental concepts in Life Sciences including chemistry. .
PSO2	Students apply scientific principles to design, conduct experiments, analyze data to draw meaningful conclusions and able to collaborate with interdisciplinary subjects
PSO3	Students will develop employability and entrepreneur skills by integrating with philosophical Approach across allied sciences

COURSE OUTCOME

BOTANY SEMESTER I

Title of the Course: MICROBIAL DIVERSITY & LOWER PLANTS				
SEM-I	**Credits: 4**	**Course Code:BOT102T**	**Year/Group: I BtBC**	**HPW: 4**
Course Outcomes				
CO1	Recall plant diseases caused by Bacteria, Viruses			
CO2	Compare Classification, General Characters, Structure and reproduction of Algal species.			
CO3	Distinguish Structure and reproduction of Fungal species and their applications.			
CO4	To justify the Structure, reproduction, life cycle and systematic position of Bryophytes & Pteridophytes			

Title of the Course: MICROBIAL DIVERSITY & LOWER PLANTS(PRACTICALS)				
SEM-I	**Credits: 1**	**Course Code:BOT102P**	**Year/Group: I BtBC**	**HPW: 2**
Course Outcomes				
CO1	Introduce students with various Algal, fungal, Bryophytes, Pteridophytes and lichens, classification, characteristics, reproduction and economic Importance.			
CO2	Identify various plant diseases, causal organisms and their control			

SEMESTER II

Title of the Course: GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS & ECOLOGY				
SEM-II	**Credits : 4**	**Course Code:BOT202T**	**Year/Group: I BtBC**	**HPW: 4**
Course Outcomes				
CO1	Relate life cycles of Gymnosperm plants.			
CO2	Compare Classifications of Plant systematics.			
CO3	Identify plants belonging to Taxonomic families.			
CO4	Discuss components of ecosystem & their modifications.			

Title of the Course: GYMNOSPERMS, TAXONOMY OF ANGIOSPERMS & ECOLOGY (PRACTICALS)			
SEM-II	**Credits : 1**	**Course Code:BOT202P**	**Year/Group: I BtBC HPW: 3**
Course Outcomes			
CO1	Perform and identify anatomical features of Gymnosperms		
CO2	Able to prepare Herbarium of Angiosperm plants.		

SEMESTER III

Title of the Course: PLANT ANATOMY AND EMBRYOLOGY			
SEM-III	**Credits: 4**	**Course Code:BOT302T**	**Year/Group: II BtBC HPW: 4**
Course Outcomes			
CO1	Describe Meristems, root & shoot apices, tissues and tissue systems		
CO2	Distinguish anomalous secondary growth and wood structure in plant species		
CO3	Discuss Anther and Ovule structures, pollen –pistil interaction.		
CO4	Justify the development of seed, Endosperm and types of embryos.		

Title of the Course: PLANT ANATOMY AND EMBRYOLOGY (PRACTICALS)			
SEM-III	**Credits: 1**	**Course Code: (BOT 302P)**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Observe the primary and secondary internal structure of monocots and dicots plants		
CO2	Learn to dissect pollen grains, viability, ovule types and developmental stages of embryo sac.		

SEMESTER III (SEC-2A)

Title of the Course: Nursery and Gardening(SEC-2A)			
SEM-III	**Credits: 2**	**Course Code:BOT SEC-2A**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Understand the life cycle of plants- germination, growth, and reproduction.		
CO2	Learn the various methods of plant propagation.		

SEMESTER III (SEC-2B)

Title of the Course: BIOFERTILIZERS AND ORGANIC FARMING (SEC-2B)			
SEM-III	**Credits: 2**	**Course Code: BOTSEC-2B**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Exemplifying types of Bio fertilizers and Organic farming.		
CO2	Experimenting the use of Bio fertilizers on crop productivity.		

SEMESTER IV

Title of the Course: CELL BIOLOGY, GENETICS & PLANT PHYSIOLOGY			
SEM-IV	**Credits: 4**	**Course Code:BOT402T**	**Year/Group: II BtBC HPW: 4**
Course Outcomes			
CO1	To recall ultrastructure of plant cell and cell division.		
CO2	To explain Mendelian inheritance, Linkage Crossing over, Gene mutation.		
CO3	To demonstrate Plant-water relations and enzyme activity.		
CO4	To Distinguish the process of photosynthesis, Respiration, Phytohormones.		

SEMESTER IV

Title of the Course: CELL BIOLOGY, GENETICS & PLANT PHYSIOLOGY (PRACTICALS)			
SEM-IV	**Credits: 1**	**Course Code:BOT402P**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Understand and explain Mendelian inheritance and their deviations		
CO2	Perform transpiration, plasmolysis, stomatal frequency and mineral deficiency experiments.		

Title of the Course: MUSHROOM CULTURE TECHNOLOGY (SEC -4A)			
SEM-IV	**Credits: 2**	**Course Code: BOTSEC-4A**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Know the life cycle, and ecological requirements of various mushroom species.		
CO2	Learn a variety of techniques for cultivating different types of mushrooms		

Title of the Course: GREENHOUSE TECHNOLOGY SEC -4B)			
SEM-IV	**Credits: 2**	**Course Code: BOTSEC-4B**	**Year/Group: II BtBC HPW: 2**
Course Outcomes			
CO1	Learn techniques for crop selection, planting, cultivation, and harvesting within greenhouse environments.		
CO2	Develop skills in operating and maintaining greenhouse equipment.		

SEMESTER V

Title of the Course: Generic Elective (GE) Industrial Microbiology			
SEM-V	**Credits: 4**	**Course Code:BOT502**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Utilizing microbes to manufacture a wide array of products by fermentation process in bioreactors.		
CO2	Employing fermentation techniques in various types of bioreactors and downstream processing.		
CO3	Choosing and applying microorganisms of industrial interest		
CO4	Understanding the diversity microorganisms present in water sources and production of bio fertilizers.		

SEMESTER V

Title of the Course: BIODIVERSITY AND CONSERVATION			
SEM -V	**Credits: 4**	**Course Code:BOT502(A)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Explain biodiversity at genetic, species, and ecosystem levels, and recognize its importance in maintaining ecological balance		
CO2	Understand and implement conservation techniques, including in-situ and ex-situ conservation methods		
CO3	Gain knowledge of global and national biodiversity conservation laws		
CO4	Apply critical thinking and problem-solving approaches to real-world biodiversity conservation challenges		
Title of the Course: BIODIVERSITY AND CONSERVATION **(PRACTICALS)**			
Sem-V	**Credits: 1**	**Course Code:BOT502(A)P**	**Year/Group: III BtBC HPW: 2**
Course Outcomes			
CO1	Explore and promote sustainable development practices that balance human needs with environmental protection		
CO2	Engage in public awareness campaigns, environmental education, and community-based conservation programs		

SEMESTER V

Title of the Course: Economic Botany			
SEM-V	**Credits: 4**	**Course Code:BOT502(B)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Learn the origin and diversity and domestication of cultivated plants		
CO2	Have awareness for economically important plants		
CO3	Re call Knowledge of plants and plant products which are used as a human diet.		
CO4	Describe the cultivation practices of oil seeds, timber, and drug yielding plants.		

SEMESTER V

Title of the Course: Economic Botany(PRACTICALS)			
SEM-V	**Credits: 1**	**Course Code:BOT502(B)P**	**Year/Group: III BtBC HPW: 2**
Course Outcomes			
CO1	Learn the economically important plants through specimens, sections and microchemical tests.		
CO2	Learn the collection of plants through herbarium preparation.		

SEMESTER V

Title of the Course: SEED TECHNOLOGY			
SEM-V	**Credits: 4**	**Course Code:BOT502(C)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Explain the fundamentals of seed biology, including seed development, structure, dormancy, and germination		
CO2	Understand techniques like cleaning, drying, grading, and packaging to enhance seed quality and longevity.		
CO3	Understand the production of hybrid seeds, their advantages, and the role of biotechnology in seed improvement		
CO4	Explain the role of seed technology in food security, sustainable agriculture, and conservation of genetic resources		

Title of the Course: SEED TECHNOLOGY PRACTICALS			
SEM-V	**Credits: 1**	**Course Code:BOT502(C)P**	**Year/Group: III BtBC HPW: 2**
Course Outcomes			
CO1	Learn appropriate methods for seed storage to maintain viability and prevent deterioration		
CO2	Develop hands-on experience in seed testing, handling, and management		

SEMESTER VI

Title of the Course: PLANT MOLECULAR BIOLOGY			
SEM-VI	**Credits: 4**	**Course Code:BOT602(A)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Compare the structure of Nucleic acids and organelle DNA		
CO2	Explain the replication of DNA Central dogma and genetic code.		
CO3	Identify Mechanism of Transcription and RNA editing.		
CO4	Distinguish Translation in prokaryotes, Transcriptional regulation in prokaryotes.		

Title of the Course: PLANT MOLECULAR BIOLOGY (PRACTICALS)			
SEC-VI	**Credits: 1**	**Course Code:BOT602(A)P**	**Year/Group: III BtBC HPW: 2**
Course Outcomes			
CO1	Estimate DNA by different techniques		
CO2	Understand and Categorize experimental methods of nucleic acids.		

SEMESTER VI

Title of the Course: TISSUE CULTURE AND BIOTECHNOLOGY			
SEM-VI	**Credits: 4**	**Course Code:BOT602(B)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Explain the main techniques of in vitro culture of plant cells & tissues.		
CO2	Know the methods used for the bio-production of plant secondary metabolites.		
CO3	Have knowledge of the basic concept of gene cloning & enzymes involved in it		
CO4	Understand the main techniques of genetic manipulation of plant organisms		

Title of the Course: TISSUE CULTURE AND BIOTECHNOLOGY

SEM-VI	Credits: 1	Course Code:BOT602(B)P	Year/Group: III BtBC HPW: 2
Course Outcomes			
CO1	Explore the isolation of plant DNA		
CO2	Learn to preparation of plant tissue culture medium		

SEMESTER VI

Title of the Course: ANALYTICAL TECHNIQUES IN PLANT SCIENCES			
SEM-VI	**Credits: 4**	**Course Code:BOT602(C)T**	**Year/Group: III BtBC HPW: 4**
Course Outcomes			
CO1	Understand Imaging and related techniques		
CO2	Identify Cell fractionation, Radioisotopes and Spectrophotometry.		
CO3	Compare Chromatography, Electrophoresis and Mass spectrometry.		
CO4	Analyze data by various Biostatistical methods.		

Title of the Course: ANALYTICAL TECHNIQUES IN PLANT SCIENCES(PRACTICALS)			
SEM-VI	**Credits: 1**	**Course Code:BOT602(C)P**	**Year/Group: III BtBC HPW: 2**
Course Outcomes			
CO1	Demonstrate various analytical techniques.		
CO2	Prepare permanent slides by staining techniques.		