PROGRAMME SPECIFIC OUTCOMES, PROGRAMME OUTCOMES AND COURSE OUTCOMES

PG DEPARTMENT OF BOTANY

B.Sc., BOTANY, EXTRA-CREDIT COURSES & VALUE-ADDED COURSES

PSO, PO & CO STATEMENTS / 2019 - 2022

PSOs	PROGRAMME SPECIFIC OUTCOMES
PSO1	Acquire good knowledge and understanding, to solve specific theoretical & practical problems in different area of Botany
PSO2	Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.
PSO3	To prepare the students who will demonstrate respectful engagement with other's ideas, behaviors, beliefs and apply diverse frames of references to decisions and actions. To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.
PSO4	Developing a research framework and presenting their independent ideas effectively.
PSO5	Equipping their employability skills to excel in professions like teaching and exposing them to various activities to empower them through communication skills.
PSO6	Enabling a holistic perspective towards the socio-political inequalities and environmental issues
B.Sc., BOTANY	
B.Sc., BOTANY / PROGRAMME OUTCOMES	
POs	**Description of POs**
PO1	Develop a broad fundamental knowledge of the plant diversity especially habit , habitat , morphology, adaptations and classification of plant kingdom.
PO2	Analyze the relationship between plants, animals, microbes and deal with the local national global environment issues by realizing the right of the individuals and also need to conserve our biosphere.
PO3	Understand how organisms function at the level of gene, genome, cell tissue, thallus, plant body drawing upon this knowledge, they are able to give specific examples of the physiological adaptations developed, reproduction and behavior of different forms of life.

PO4	Gain knowledge about the application of biological sciences in mushroom cultivation, azolla cultivation, nursery management, herbal garden management, pest management, there by impart skill as well a source of income and self employment .
PO5	Generate innovative ideas for performing experiments in the areas of biochemistry, physiology, genetics, microbiology, Developmental biology, anatomy, taxonomy, economic botany, and ecology.
PO6	Explain the recent developments in genetic engineering, biotechnology, microbiology, for research activities in the department or in collaboration with other research institutions.
PO7	Organize and deliver relevant applications of knowledge through effective written verbal, graphical/virtual communications and interact with people from diverse back ground.

B.Sc., BOTANY / COURSE OUTCOMES

	Description of COs	**Bloom's Taxonomy / Cognitive Domain**
	Algae and Bryophyte	
CO1.	Understands about general characters, classification and economic importance of algae.	K1
CO2.	Students are taught the detailed structure of some algal forms	K2
CO3.	Imparts knowledge about various algal species	K2
CO4.	Understands about morphology, structure, reproduction and life cycle of bryophytes.	K2
CO5.	Students gain fundamental knowledge about evolution and economic importance of bryophytes.	K5
	Fungi, Lichenology and Plant Pathology	
CO1.	To study, classify Fungi and also understand the economic importance of Fungi	K1
CO2.	Understands the characteristic features of different groups of Fungi	K2
CO3.	Imparts knowledge about the life cycle of various groups of Fungi	K2
CO4.	Understands the types, lifecycle and benefits of Lichens	K2
CO5	Gain knowledge about the Causes, Symptoms and Control measures of Plant diseases.	K5

SBC - Biofertilizers		
CO1.	Enable the students to understand the scope, importance and applications of symbiotic bacteria.	K1
CO2.	Gains knowledge about Non- symbiotic bacteria.	K2
CO3.	Understands the mass cultivation and field applications of Blue green algae.	K2
CO4.	Study the mass cultivation and field applications of VAM fungi.	K2
CO5.	Develop an interest to study the role of Mycorrhizae in agriculture.	K3
Ancillary Botany Paper I - Algae, Fungi, Plant Pathology, Bryophytes, Pteridophytes, Gymnosperms and Anatomy		
CO1.	Impart knowledge about classification, structures and lifecycle of different forms of algae	K1
CO2.	Students gain fundamental knowledge of fungi and its various forms.	K2
CO3.	Understands the classification and lifecycle of Bryophytes and Pteridophytes.	K2
CO4.	Develop interest in understanding the classification of Gymnosperms.	K2
CO5.	Study the anatomical structures of dicot and monocot plants.	K3
Pteridophytes, Gymnosperms and Paleobotany		
CO1.	Impart knowledge about classification, structures and lifecycle of different forms of fossil pteridophytes.	K1
CO2.	Students gain fundamental knowledge of structure, reproduction and lifecycle of Pteridophytes.	K2
CO3.	Understand the morphology and reproduction of *Equisetum* and *Marsilea*	K2
CO4.	Classify the Gymnosperm, morphology and reproduction of *Williamsonia, Pinus, Cupressus* and *Gnetum*	K2
CO5.	Comprehend the geological time scale, kinds of fossils and Radio carbon dating	K3
Practical Paper I		
CO1.	Impart knowledge about structures and different forms of Plant diversities through microscope.	K4
CO2.	Students gain knowledge about the spotters and identify the specimens.	K4
CO3.	Understand the morphology and taking sections.	K4
CO4.	Develop skills to identify the different species.	K4
CO5.	Develop drawing sketches of the structures of the specimens.	K5
Ancillary Botany Paper II- Taxonomy of Angiosperms , Embryology, Plant Physiology and Plant Ecology		
CO1.	Impart knowledge about structures and different forms of Plant diversities through microscope.	K1
CO2.	Students gain knowledge about the spotters and identify the specimens.	K2
CO3.	Understand the morphology and taking sections.	K2
CO4.	Develop skills to identify the different species.	K2
CO5.	Develop drawing sketches of the structures of the specimens.	K3

Ancillary Botany Practical Paper I		
CO1.	Impart knowledge about structures and different forms of Plant diversities through microscope.	K4
CO2.	Students gain knowledge about the spotters and identify the specimens.	K4
CO3.	Understand the morphology and taking sections.	K4
CO4.	Develop skills to identify the different species.	K4
CO5.	Develop drawing sketches of the structures of the specimens.	K5
SBC – Herbal Cosmetics		
CO1.	Enable the students to understand the need and advantages of herbal cosmetics.	K1
CO2.	Gains knowledge to prepare face pack using herbs.	K2
CO3.	Understands the preparations of herbal powder and soaps.	K2
CO4.	Study the preparations of different types of hair oils.	K2
CO5.	Develop an interest to study the preparations of foot cream and megandi decorations.	K3
Biochemistry, Biophysics and Biotechniques		
CO1.	Impart knowledge about atoms, bonds, pH, buffer and properties of water	K1
CO2.	Students gain fundamental knowledge of structure, classification and properties of biomolecules.	K2
CO3.	Understand the mechanism of enzyme action, and also study the structure, properties, nomenclature and classification of enzymes.	K2
CO4.	Develop knowledge in concepts of biophysics.	K2
CO5.	Develop skills in studying and using instruments of biotechniques.	K3
SBC – Basic Bioinformatics		
CO1.	Enable the students to understand the components of computers	K1
CO2	Gains knowledge about computer languages, internet and email.	K2
CO3	Understands the windows, ms office, excel and powerpoint.	K2
CO4	Study the basics of bioinformatics and phylogenetic analysis.	K2
CO5	Develop an interest to study the biomolecular visualization and computer aided drug designing.	K3
NME- Gardening and Nursery Management		
CO1	Enable the students to understand the cropping pattern of garden.	K1
CO2	Gains knowledge about components of garden.	K2
CO3	Understands the methods of cultivating indoor garden and flower arrangement.	K2
CO4	Study the cultivation of vegetables and extraction of jasmine.	K2
CO5	Develop an interest to study the cultivation of orchards and intercropping.	K3

Plant Anatomy and Plant Ecology		
CO1	Impart knowledge about meristems and its various theories.	K1
CO2	Students gain fundamental knowledge of structure and classification of simple and complex tissues.	K2
CO3	Understand the primary and secondary structure of Dicot and Monocot plants.	K2
CO4	Develop knowledge in studying nodal anatomy.	K2
CO5	Develop skills in identifying morphological, physiological and anatomical adaptations of plants.	K3
Cell Biology and Embryology		
CO1	Gain knowledge about prokaryotic and eukaryotic cell, different microscopes.	K1
CO2	Students understand the structure and functions of cell organelles like mitochondria, nucleus and chromosomes.	K2
CO3	Understand the structure and functions of golgi complex and cell division.	K2
CO4	Develop knowledge in studying the development of male and female gametophyte and types of ovule.	K2
CO5	Understand the types of endosperm, double fertilization and triple fusion.	K3
Major Practical Paper II		
CO1.	Impart knowledge in doing biochemistry experiments	K4
CO2.	Students gain knowledge about the spotters and identify the specimens.	K4
CO3.	Understand the morphology and taking sections.	K4
CO4.	Develop skills to identify the different species.	K4
CO5.	Develop drawing sketches of the structures of the specimens.	K5
SBC - Mushroom For Livelihood		
CO1.	Gain knowledge about the nutritional and medicinal value of mushrooms.	K1
CO2.	Students understand the structure and characteristics of edible mushrooms.	K2
CO3.	Understand the cultivation methods, spawn production techniques and harvesting of mushrooms.	K2
CO4.	Develop knowledge in studying the problems in mushroom cultivation.	K2
CO5.	Understand the preparation of mushroom recipes.	K3
Taxonomy of Angiosperms and Economic Botany		
CO1.	Impart knowledge about the morphological structures of angiosperms	K1
CO2.	Students understand the binomial nomenclature, herbarium technique and classification of angiosperms.	K2
CO3.	Understand the morphology and economic importance of families.	K2
CO4.	Develop knowledge in identifying different families.	K2
CO5.	Understand the extraction, chemical constituents and uses of rubber and coffee.	K3

General Microbiology		
CO1.	Acquire knowledge about the characteristics, multiplication and control of viruses.	K1
CO2.	Students understand the food poisoning, industrial manufacture of ethanol, penicillin, etc.	K2
CO3.	Understand the decomposition, functions of humus and microbial degradation of cellulose.	K2
CO4.	Develop knowledge in sewage treatment and control of microorganisms.	K2
CO5.	Understand the structure of antigen and antibody, their reaction and types of immune systems.	K3
Elective I - Plant Biotechnology		
CO1.	Acquire knowledge about the techniques used in biotechnology.	K1
CO2.	Students understand the recombinant DNA technology and human health care products.	K2
CO3.	Understand the plant tissue culture techniques and its role in crop improvement.	K2
CO4.	Develop knowledge in transgenic plants and biological control of pathogens..	K2
CO5.	Understand the composition of biomass and intellectual property rights.	K3
Elective I - Habitat Ecology		
CO1.	Impart knowledge about the uniqueness of the varying habitats in the biosphere.	K1
CO2.	Students acquire knowledge about the structure and functions of different ecosystem.	K2
CO3.	Understand the ecology of various habitats.	K2
CO4.	Develop knowledge in understanding the environmental legislations.	K2
CO5.	Understand the inventory of habitats.	K3
Elective II - Horticulture and Landscaping		
CO1.	Enrich knowledge about the techniques of orchard cultivation, soil management practices and pruning techniques.	K1
CO2.	Students understand the vegetative propagation methods and systems of irrigation.	K2
CO3.	Understand the different methods of gardening and flower arrangement.	K2
CO4.	Develop knowledge in cultivation of vegetables, fruits and flowers and extraction of jasmine.	K2
CO5.	Understand the uses of kitchen garden and its necessity.	K3
Elective II - Plant Tissue Culture		
CO1.	Impart knowledge about culture media and aseptic techniques.	K1
CO2.	Students understand the micropropagation	K2
CO3.	Understand the anther culture, pollen culture, ovary culture, etc.	K2
CO4.	Develop knowledge in understanding the artificial seed production.	K2

CO5.	Understand the secondary metabolites and cryopreservation.	K3
	SBC - Food Preservation	
CO1.	Enrich knowledge about the various process of food preservation.	K1
CO2.	Students understand the process of canning of apples and carrot.	K2
CO3.	Understand the different methods of preservation process of fruit juices.	K2
CO4.	Develop knowledge in understanding the preparation of jelly and jam.	K2
CO5.	Understand the preparation of different sauces and different kinds of pickles.	K3
	Plant Physiology	
CO1.	Impart knowledge about absorption of water, ascent of sap and transpiration.	K1
CO2.	Students understand the importance of mineral nutrition and photosynthesis	K2
CO3.	Understand the various aspects of respiration, photorespiration and mechanism of respiration.	K2
CO4.	Develop knowledge in nitrogen metabolism.	K2
CO5.	Understand the physiology of flowering, seed dormancy and biological clock.	K3
	Genetics and Molecular Biology	
CO1.	Impart knowledge about gene interaction and multiple alleles	K1
CO2.	Students understand the theories of crossing over and mutations	K2
CO3.	Understand the mechanism of sex determination in plants.	K2
CO4.	Develop knowledge in DNA and RNA structure, replication and types.	K2
CO5.	Understand the gene regulation in prokaryotes and operon concepts.	K3
	Elective III - Herbal Medicine and Human Welfare	
CO1.	Impart knowledge about different systems of medicines.	K1
CO2.	Students understand the systematic study of crude drugs.	K2
CO3.	Understand the drugs obtained from flowers, fruits, seeds and all parts of plants.	K2
CO4.	Develop knowledge in understanding cardio vascular drugs and anticancer drugs.	K2
CO5.	Understand the medicinal properties of Ricinus and Citrus.	K3
	Elective III – Plant Breeding, Evolution, Seed Technology and Biostatistics	
CO1.	Impart knowledge about Hybridization.	K1
CO2.	Students understand the evolution.	K2
CO3.	Understand the Seed Technology.	K2
CO4.	Develop knowledge in understanding the seed processing and certification.	K2
CO5.	Understand the Biostatistics - mean, median and mode.	K3
	Major Practical Paper III	

CO1.	Impart knowledge in doing streaking and staining techniques.	K4
CO2.	Students gain knowledge about the spotters and identify the specimens.	K4
CO3.	Understand the morphology and taking sections.	K4
CO4.	Develop skills to identify the different species.	K4
CO5.	Develop drawing sketches of the structures of the specimens.	K5
Major Practical Paper IV		
CO1.	Impart knowledge in doing physiology experiments.	K4
CO2.	Students gain knowledge about the spotters and identify the specimens.	K4
CO3.	Understand the morphology and taking sections.	K4
CO4.	Develop skills to identify the different species.	K4
CO5.	Develop drawing sketches of the structures of the specimens.	K5
NME - Herbal Therapeutics		
CO1.	Impart knowledge about different systems of medicines.	K1
CO2.	Students understand the systematic study of crude drugs.	K2
CO3.	Understand the drugs obtained from flowers.	K2
CO4.	Develop knowledge in understanding drugs obtained from fruits, seeds and all parts of plants.	K2
CO5.	Understand the medicinal properties of *Vinca* and *Gloriosa*..	K3
EVS - Environmental Studies		
CO1.	Impart knowledge about environment.	K1
CO2.	Students understand the natural resources.	K2
CO3.	Understand the ecosystem, ecological succession and ecological pyramids.	K2
CO4.	Develop knowledge in understanding biodiversity and its conservation.	K2
CO5.	Understand the environment, its pollution and the human population and environment.	K3
Extra Credit Papers		
Extra Credit Paper I – Dietary and Nutritional Value of Fruits and Vegetables		
CO1.	Impart knowledge about balanced diet.	K1
CO2.	Students understand the functions of food.	K2
CO3.	Understand the nutritional classification of foods.	K2
CO4.	Develop knowledge in understanding the diet for various deficiencies.	K2
CO5.	Understand the allergic and non allergic foods.	K3
Extra credit paper II - Commercial Plant Products		

CO1.	Impart knowledge about balanced diet.	K1
CO2.	Students understand the functions of food.	K2
CO3.	Understand the nutritional classification of foods.	K2
CO4.	Develop knowledge in understanding the diet for various deficiencies.	K2
CO5.	Understand the allergic and non allergic foods.	K3
Extra Credit Paper III – Biodiversity Conservation and Management		
CO1.	Impart knowledge about environment.	K1
CO2.	Students understand the natural resources.	K2
CO3.	Understand the threats and natural calamities.	K2
CO4.	Develop knowledge in understanding biodiversity and its conservation.	K2
CO5.	Understand the environment, In situ and Ex situ Conservation.	K3
Value Added Course		
Value Added Course I - Organic Farming		
CO1.	Understands the merits of organic farming over conventional farming	K1
CO2.	Students learn the preparation of various organic manures and panchakavya	K2
CO3.	Imparts knowledge to analyse the water and weed management practices	K2
CO4.	Understands to prepare herbal pest repellents	K2
CO5.	Students gain knowledge by visiting organic farms	K5
Value Added Course II - Landscape Gardening		
CO1.	Understands the merits of garden designing	K1
CO2.	Students learn the various components of garden	K2
CO3.	Imparts knowledge about the soil, organic and inorganic fertilizers	K2
CO4.	Understands the propagation and plant protection	K2
CO5.	Students gain knowledge by visiting different landscapes	K5
Value Added Course III – Terrace Gardening		
CO1.	Understands the importance of terrace garden	K1
CO2.	Students learn the preparation of potting mixture	K2
CO3.	Imparts knowledge to grow bonsai plants	K2

CO4.	Understands to maintain the shade houses	K2
CO5.	Students gain knowledge by visiting many roof gardens	K5