B.A/B.Sc (Hons)/B. Sc (Gen)	Paper	Prerequisite	Course outcome
SEM-I (Hons)	Core Course-I Course Code:BOTACOR01T	Five kingdom classification, concept about prokaryotes, General character of bacteria cell structure and reproduction of bacteria and virus, general character of algae,its pigment, few characters of chlorophyceae	• Students will be able to get an idea about three domain classification. • They will be acquired the knowledge about the role of microbes in daily life. • Students will be able to apply the aquired knowledge to identify the viral or bacterial disease in plants. • They would acquire knowledge about the microbial role in agricultural and industrial aspects. • Students will have knowledge about the classification of the virus and bacteria. • They are supposed to knowledge about the reproduction in microbes. • Students will be able to identify plant and animal virus through photograph. • They are expected to identify and classify various types of bacteria based on morphological features under the microscope. • They could stain the bacterial spore and easily understand its internal structure. • They will be able to isolate the microbes from soil, water or air. • Students will know about the occurrence, cell structure and general characteristic feature of various types of algae. • They will be able to make chart of algal classification. • They will be able to identify various unknown algae under the microscope. • They will be able to compare various algae according to their thallus and reproductive characters. • Students will apply their knowledge about algal role in agriculture, biotechnology and industrial product. • To apply their knowledge students can identify the algal genera like *Nostoc,Volvox,Oedogonium,Polysiphonia,Fucas, Chara* etc.
	Core Course-II Course Code:BOTACOR02T	Chemical bonds, ph, structure of water, general concept of cell and cell organells, cell division, brief idea about enzymes.	• Students will be able to draw various types of bond present in biomolecules. • Students will be able to classify the carbohydrate molecules. • They will be able to draw the chemical structure of protein, carbohydrate and lipids molecule. • They will be able to identify the types of sugar from plant sample by qualitative test. • They will understand the physical and chemical structure of DNA and RNA. • They will be able to compare A,B & Z DNA. • They will be able to draw the chemical structure of nucleotide.

			• They will be able to understand about the structure of prokaryotic and eukaryotic cell and cell organelles and their role. • They will be able to understand the origin of eukaryotic cell. • They will be able to draw cell cycle and different stages of cell division. • They will be able to identify the different stages of divisional stages under the microscope. • They will be able to get an idea about checkpoints. • They could also understand the structure of any type of plant cell under microscope. • The will be able to understand the chemical structure of enzyme. • They will be able to solve various type of problem from enzyme. • Students will be able to explain the enzyme mechanism. • They will be able to draw graph about inhibition of enzyme and action of enzyme. • They will be able to draw Structure of ATP. • The will be able to understand various laws of thermodynamics. • They will be able to explain role of cell organelle in the various biological mechanism
SEM-II (Hons)	Core Course-III Course Code:BOTACOR03T	Classification of plant kingdom, Five kingdom Classisfication, General character of Fungi and their several classes, plant diseases, lichen, Mycorrhiza.	• Students will be able to understand the Affinities of fungi with plants and animals. • They will be able to get an idea about the Plant diseases and their management • Students will be able to classify the Fungi and their placing order. • Students will be able to identify the fungal diseases of plants and animals. • Students will be able to understand the asexual and sexual spore of Fungi . • Students will be able to draw the Life cycle pattern of various fungi. Plant diseases and their causal organism and symptoms. • Students will be able to understand the Symbiotic relation as well as host and pathogen relationship of fungi. • Students will be able to understand the Parasexulity of fungi. • Students will be able to draw the life cycle of different fungi. • Students will be able to identify the genus *Saccharomyces, Aspergillus, Penicillium, under microscope.* • Students will be able to identify *Alternaria, Neurospora* under microscope • Students will be able to get an idea about on the Role of fungi in biotechnology; application of fungi in food industry (flavour& texture • Students will be able to understand the Role of fungi in ,fermentation, baking, organic acids, enzymes, mycoproteins in practical life.
	Core Course-IV Course Code:BOTACOR04T	Classification of plant kingdom, Five kingdom Classisfication, broad	• Students will be able to get Concepts on archegoniates.

		knowledge on algae, General character of bryophytes, pteridophytes and gymnosperms. Knowledge on alteration of generation.	• Students will be able to understand the Water to land transition and their adaptations • Students will be able to classify the Petridophytes and Gymnosperms • Students will be able to to describe characteristics features of different classes. • Students will be able to classify the Early land plants , bryophytes • Students will be able to describe the • characteristics features of different classes. • Students will be able to identify the gametophytic and sporophytic generation, reproduction and alteration of generation of *Ricciaand Marchantia, Psilotum, Selaginella, Equisetum*and*Pteris, Cycas, Pinus*and *Gnetum*
SEM-III (Hons)	Core Course-V Course Code:BOTACOR05T	Concept about the floral structure of angiospermic plants. Internal anatomical tissue system present in root, stem and leaf of angiosperm.	• Student will be able to identify the various types of inflorescence present at their surroundings. • Students will be able to classify the inflorescence. • They will be able to draw the floral diagram of different wild and cultivated plants by using their knowledge, acquired. • They will be able to compare between the dehiscent and indehiscent fruits. • They will be able to make a chart of different type of fruits. • They will be able to understand the internal tissue system present in an angiospermic plant body. • They will be able to draw the different kind of vascular cambium. • They will be able to identify xylem element under the microscope. • They will be able to compare between heart wood and sap wood. • They will be able to identify the stomatal types under the microscope. • Students will be able identify the distribution of tissue system through hand sectioning of plant material. • Student will be able compare the anatomical structure of dicot and monocot plants. • They will be able understand the organization of root apex. • Students will be able to explain Tunica Corpus & Korper Kappe Theories..
	Core Course-VI Course Code:BOTACOR06T	Concept about economical important plants. Recall the name of some cereal, legumes, spices ,beverage and fibre yielding plants.	• Students will be able to get an idea about the concept of centres of origin of crop plants • Students will be able to understand the process of crop domestication.\ • They will be able recall the scientific name, family and used parts of cereals, legumes, spices, oils, drug timber and fibres yelding plants. • They will be able to draw the habit sketch of rice,Groundnut,Potato,Black pepper,Digitales etc • They will be able to make a model of tapping of rubber.

			• They will be able to perform the various micro chemical test for identification of starch,sugar,protein,fat, alkaloid present in crop plants • They will be able to identify the chemical components present in fibre yelding plants performing chemical tests. • They will be able to identify the medicinal plants like *Cinchona*, *Digitalis*, *Papaver*, *Canabis*, Tobacco. • They will be able to make a list of timber yielding plants and oil yielding plants. • They will be able to known about the name of essential oil yielding plants and its extraction method. • Students will be able to explain the processing of tea and coffee.
	Core Course-VII Course Code:BOTACOR07T	• Concept about DNA and RNA, mitosis and meiosis. • Structure of chromosome.	• Students will be able to understand the Mendelian inheritance. • They will be able to explain to non-Mendelian • Inheritance. • They will be able to compare the dominant and recessive traits. • They will be able to understand polygenic inheritance • They will be able to punnett square board. • Students will be able to explain extrachromosomal inheritance. • They will be able to give various example of cytoplasmic inheritance found in plant and animals. • Students will be able to construct the linkage map. • They will be able to calculate the map distance among the genes. • They will be able to calculate the recombination frequency. • Students will be able to correlate their practical knowledge with the sex linked character. • They will be able to draw and explain translocation and inversion. • Students will be able to correlate with downs syndrome, Klinefelter's syndrome ,Turner syndrome with numerical changes of chromosomes. • Students will be able to identify the various types of chromosomal aberration under the microscope. • Students will be able to identify the dominant and recessive genetic traits in human being. • The will be able to calculate the gene and allele frequency. • They will be able to understand the fine structure of gene. • Students will be able to compare classical and molecular concept of gene. • They will be able to apply Hardy-Weinberg law to solve the problems on population genetics. • They will be able to understand the molecular basis of mutation. • The will be able to make a chart of types of mutation.

			• They will be able to classify the various type of mutagens. • They will be able to understand both the harmful and beneficial role of mutation. • They will be able to get an idea about Dna repair mechanism.
	Skill Enhancement Course 1 Course code: BOTSSEC01M	Basic knowledge on ecology, Environment, Biotic and abiotic components and their interactions, biodiversity and conservtion	• Students will be able to get detailed idea about species diversity, genetic diversity and ecosystem diversity. • They will be able to understand values and uses of biodiversity. • They will be able to understand loss of biodiversity and management strategies. • They will be able to get an detailed idea of conservation of biodiversity • They will be able to understand the role of plants in relation to human welfare like importance of forestry, ornamental plants, avenue trees, alcoholic beverages, fruits and nuts, woods.
SEM-IV (Hons)	Core Course-VIII Course Code:BOTACOR08T	DNA structure, Genetic material DNA, Replication , Central Dogma, Transcription and translation .	• Students will be able to understand the Genetic material is DNA – Conformed ,not RNA or Protein. • Students will be able to draw Structure of DNA • Students will be able to draw and compare the Nitogenous bases of DNA,RNA • Students will be able explain the Operon Model • Students will be able to understand the Central Dogma • Students will be able to understand the Enhancer and silencer • Students will be able to understand the Chromatin Structure & types • Students will be able to explain the RNA modification process • Students will be able to describe the structur of Mt and Cp DNA • Students will be able to understand the Concept of Exon and Intron • Students will be able to understand the Semiconservative mode of replication • Students will be able explain the Splicing mechanism • Students will be able compare the Different types of replication in virus, bacteria and eukaryotes • Students will be able to understand the Translation process in prokaryotes and eukaryotes • Students will be able get an idea about Salient features of Genetic Code • Students will be able to understand the Post translational modification • Students will be able to understand the Translational inhibitors and their role • Students will be able to demonstrate the experiment of the Deciphering of genetic code • Students will be able to make list of Different enzymes involved in replication both prokaryotes and eukaryotes

			• Students will be able to understand the Discovery of m-RNA & Adopter hypothesis
	Core Course-IX Course Code:BOTACOR09T	Environment, Biotic and abiotic components and their interactions, Basic knowledge on ecology, ecosystems, food web, food chain and ecological pyramids. Centre of origin of crop plants.	• Students will be able to understand about the Basic knowledge on the molecular and physical structure and properties of water and Biological importance of water. • Students will be able to understand how the hydrological cycle operates and basic knowledge about the water table • Students will be able to get an Idea on soil forming process • Students will be able to make a list of biological and chemical components of soil • Students will be able to understand how plants adapt to the varied light, temperature and wind conditions of their environment.An understanding on how biotic organisms interact with their abiotic counterparts • Students will be able to understand the basic knowledge of natural selection and process of ecological speciation • Students will be able to draw the energy flow in an ecosystem • Students will be able to realize that how the fundamental radicals move through the biotic and abiotic components of earth. • Students will be able to get an idea about the Productivity of an ecosystem and A basic concept of ecosystem and its components • Students will be able to get an idea about about the stages of plant succession • Students will be able to understand the brief knowledge on theory of continental drift and endemism • Students will be able to classify the the different phytogeographical zones of India and their vegetations & Knowledge of Biomes
	Core Course-X Course Code:BOTACOR010T	Plant Kingdom, Angiosperm Character,Morphological Character of Plants, Angiosperm Classification, Boptanic Garden, Herbarium	• Students will be able to understand the Concept of taxonomy,systematic. • Students will be able to make a chart of the Types of classification. • Students will be able to understand the Significance of herbarium and botanical gardens. • Students will be able to understand the Significance of e-flora. • Students will be able to get an idea about Concept of hierarchy & Species concept • Students will be able to describe the Principles of ICBN • Students will be able to make a chart of the different Nomenclatural Types • Students will be able to explain the Rejection of names & Rules of priority in taxonomic view.
	Skill Enhancement Course 2 Course code: BOTSSEC02M	Concept of medicinal uses of plants, identification, classification and nomenclature of	• Students will get an idea about ethnobotany • They will acquire the knowledge on methodology of Ethnobotanical studies like Field work, Herbarium, Ancient Literature, Archaeological findings, temples and sacred places.

		angiosperms.Herbarium .	• They will understand the role of enthnobotany in modern medicine • They will get an idea about the Significance of plants in ethno botanical practices
SEM-V (Hons)	Core Course-XI Course Code:BOTACOR11T	Concept about the male and female reproductive part of angiosperm.	• Students will be able to understand the structure of ovule and anther. • Students will be able to classify the ovule on the basis of its structure. • They will be able to identify the ovule, pollen grain, endosperm and embryo under the microscope, • They will able to explain the double fertilization process. • They will be able to identify dicot and monocot embryo under the microscope. • They will be able to apply their knowledge in fruit production. • They will be able to understand the self Incompatibility phenomenon. • They will be able to draw the egg apperatus and different kind of endosperm. • They will be able to summarize the process of embryo development. • They will be able to realize the relationship between endosperm and embryo. • They will be able to describe megagametogenesis process. • They will be able to perform the pollen viability test. • They will be able to construct their knowledge about NPC system. • They will be able to realize the scope of palynology in practical life. • They will be able to compare the different kind of female gametophyte • They will be able to apply their knowledge to overcome self incompatibility. • They will be able to apply their knowledge in cybrid production. • They will be able to draw the path of pollen tube in pistil.
	Core Course-XII Course Code:BOTACOR12T	Concept about water,internal structure and function of root, stomata, function and component of conductive tissue ,Recall the name of different kind of plant hormones, Recall the name of some minerals required for nutrion.	• They will be able to explain the stomatal movement mechanism. • They will be able to understand the pathway of water from root hair cell to vascular bundle. • They will be able to realize the role of different trans-membrane protein in the process of transportation and absorption. • They will be able to compare the active and passive transport mechanism. • They will be able to identify the deficiency of minerals in their surrounding flowering and cultivated plants. • They will be able to make a list of minerals required in plant nutrition. • They will be able to explain the phloem loading and unloading mechanism.

			• They will be able to apply their knowledge practically to overcome seed dormancy and eradicate the weeds from garden. • They will be able to understand the role of phytochrome in short day and long day plant for its flowering. • They will be able to explain the bioassay of auxin, gibbereline, cytokinine, and ABA. • They will be able to draw the chemical structure of natural and synthetic phytohormones. • They will be able to apply the knowledge of synthetic hormone in agriculture. • They will be able to apply the knowledge of photoperiodism in floriculture. • They will be able to understand the role of secondary metabolites like Brasssinosteroid and Jasmonic acid in plant growth. • They will be able to understand the role of ATP molecule during active transport mechamism. • They will be able to understand the source sink relationship • They will be able to explain photomorphogenesis process.
	Discipline Specific Elective 1 Course Code: BOTADSE01T	Concept about environment, ecology, ecosystem, pollution,.	• Students will be able to compare renewable and nonrenewable resources of energy. • They will be able to understand the concept and approaches of sustainable utilization. • They will be able to apply their knowledge in utilization and management of forest,land and water. • They will be able to understand the role of IPR,CBD and National Biodiversity Action plan. • They will be able to able to make a list of major and minor product of forest. • They will be able to get an idea about the different type of forest present in India, its coverage and significance. • They will be able to get an idea about the practices in resource management. • They will be able to apply their knowledge in waste management. • They will be able to relate ecological foot print with carbon foot print. • They will be able to recall the full name, head office of ZSI,BSI,IUCN,UNESCO,UNEP,IBIN,WBBBDB. • They will be able to Know about the national effort in conservation and management. • They will be able to understand the role of international organization in conservation and management.
	Discipline Specific Elective 2 Course Code: BOTADSE02T	Concept about flowering plant,fruit yielding plant, role of hormone in floweing,fruit production, vegetables.	• Students will be able to define the term horticulture, ornamental plant, floriculture, pomology related to horticulture. • They will be able to understand the role of horticulture in our practical life. • They will be able to apply their knowledge for job.

			• They will be able to make a chart of different branches of horticulture. • They will be able to classify the ornamental plants, • They will be able to identify the ornamental flowering tree, sages ,flowering plant, cactus. • They will be able to get an idea about the origin ,distribution and production vegetables ,fruits. • They will be able to understand about the management and marketing of fruit, vegetables. • They will be able to compare the biofertilizer and chemical fertilizer. • They will be able to understand the different kind of advanced irrigation methods. • They will be able to apply their knowledge for artificial propagation in home or in field like grafting, layering, cutting. • They will be able to make a design or layout for garden, parks or avenue. • They will be able to summarize the gardening from ancient India to modern civilization. • They will be able to able to understand the policies and practices of urban forestry. • T They will be able to make bonsai for commercial purposes. • They will be able to utilize their knowledge about in floriculture for market demand. . • They will be able to understand the scope and limitation of horticultural technique. • They will be able to identify the deficiency symptom and take initiatives to overcome this problems. • They will be able to understand the post harvest technology and handling of cut flower, fruits and vegetable. • They will be able to understand the IPM strategies, quarantine practice. • They will be able to identify the common diseases and related pests of fruits, vegetables a& ornamental plants. • They will be able to understand the role of micropropagation, and tissue culture in production of horticultural crop. • They will be able to get an idea about varieties and cultivars of various horticultural crops.
SEM-VI (Hons)	Core Course-XIII Course Code:BOTACOR13T	Concept about plant physiological process of absorption, transportation, transpiration, Enzyme,	• They will be able to compare the anabolic and catabolic reaction with example.. • They will be able to understand enzyme regulation process. • The will be able to understand the chemical structure of enzyme. • They will be able to solve various type of problem from enzyme. • Students will be able to explain the enzyme mechanism. • They will be able to draw graph about inhibition of enzyme and action of enzyme. • They will be able to understand the allosteric mechanism. • They will be able to draw Structure of ATP.

			• They will be able to compare PSI and PSII. • They will able to recall the name of photosynthetic and accessory pigmnents. • They will be able to separate the photosynthetic pigments. • They will be able to present schematically the C4,C3,CAM and C2 cycle. • Students will be able to interpret the light reaction. • They will be able to describe the metabolism process of sucrose and starch. • They will be able to count ATP molecule originate during respiration. • They will be able to perform an experiment to compare the rate of respiration in different parts of a plant. • They will be able to represent the flowchart of Glycolysis, TCA cycle,oxidative pentose phosphate pathway. • They will be able to understand the mitochondrial electron transport. • They will be able to understand ATP synthesis mechanism. • They will be able to represent the flowchart of beta-oxidation and glyoxalate cycle. • They will be able to get an idea about Gluconeogenesis process. • Students will be able to understand the process of biological nitrogen fixation in non legume and legumes. • They will be able to explain ammonia assimilation process. • They will be able to explain the role of G protein and calcium calmoduline in signal transduction mechanism. • They will be able to perfofm a test to lipase activity during oilseed germination. • They will be able to demonstrate the experiment on activity of nitrate reductase in different types of germinating seeds
	Core Course-XIV Course Code:BOTACOR14T	Concept about the medium, define the term biotechnology,Known abuout the term of plant tissue culture.	• Students will be able to understand the role of vitamins and hormones in different kind of medium used in plant tissue culture. • They will be able to able to define the term totipotency,callus,organogenesis,androgenesis,micropropagation. • They will be able to explain the steps of protoplast isolation. • Students will be to prepare MS medium • They will be able to inoculate different explants. • They will be able to to compare embryogenesis and androgenesis • They will be able to understand the process of protoplast fusion. • They will be able to apply the knowledge of tissue culture application in agricultural field. • They will be able to get an idea about germplasm conservation. • They will be able to understand the process involve in recombinant dna technology.

			• They will be able to classify the different types of restriction enzymes. • They will be able to draw and describe the various biological vector used in gene cloning technique. • They will be able to construct the both circular and linear restriction mapping. • They will able to understand the bacterial transformation process. • They will be able to understand the selection mechanism of recombinant clone. • They will be able to understand the process of screening of recombinant dna. • They will be able to get an idea about PCR. • They will be able to understand the steps of construction of cDNA library and genomic libraries. • Students will be able to get an idea about direct gene transfer methods like electroporation,microinjection, microprojectile, bombardment. • Students will be able to explain Agrobacterium mediated gene transfer mechanism through photograph. • They will be able to demonstrate the experiment of isolation of genomic DNA and electrophoresis • They will be able to recall the application of biotechnology. • They will be able to describe thesteps of genetic engineering for production of Bt cotton,Golden rice,Flavr Savr.
	Discipline Specific Elective 3 Course Code: BOTADSE04T	Concept about the microscope, recall the uses of electron microscopy, chi square test,	• Students will be able to get an idea about the structure and principle of fluorescence and confocal microscopy. • They will be able to understand the reason of use of fluorochromes in flow cytometry and fluorescence microscopy. • They will be able to describe the steps of sample preparation for electron microscopy. • They will be able to compare between TEM & SEM, • They will be able to understand about chromosome painting technique, freeze etching technique cryo-fixation and their application. • Students will be able to get an idea about centrifugation technique using sucrose density gradient,CsCl2 density gradients, ultracentrifugation for cell fractionation. • They will be able to understand the role of radioisotope in auto radiography and biological research. • They will be able to demonstrate Pulse Chase experiment. • Students will be able to describe the principle and application of spectrophotometry in biological research. • They will be able to understand the principle of different kind of chromatography and their uses in separation of biomolecules.

			• They will be able to get an idea about yhe structure, principle and application of Mass spectrometry, X-ray crystallography and X-ray diffraction. • They will be able to get an idea about different kind of electrophoresis technique using in separation of protein,dna ,rna molecule. • They will be able to demonstrate the experiment of separation of protein by PAGE and separation of DNA by AGE. • They will be able to estimate the protein concentration by Lowry method. • Students will be able to define biostatistics, variables,sample. • They will be able to understand the limitation and uses of statistics. • They will be able to understand the methods of data collection procedure. • They will be able to compare primary and secondary data. • They will be able to classify the methods of sampling. • They will be able to define mean,mode,median,measure of central tendency. • They will be able to calculate mean,mode,median, geometric mean from statistical problem • They will be able to apply the chi square formula to decide whether the hypothesis good fit or not.
	Discipline Specific Elective 4 Course Code: BOTADSE06T	Concept about the formula of chi-square test(Goodness of Fit.and Fisher table	• Students will be able to define biostatistics, variables,sample. • They will be able to understand the limitation and uses of statistics. • They will be able to understand the methods of data collection procedure. • They will be able to compare primary and secondary data. • They will be able to classify the methods of sampling. • They will be able to represent the data in bar diagram,line diagrame, pie diagrame.Frequency polygone. • They will be able to draw the frequency curve or normal distribution curve. • They will be able to define mean,mode,median,measure of central tendency. • They will be able to compare mean,median. • They will be able to calculate mean,mode,median, geometric mean from statistical problem • They will be able to identify grouped and ungrouped data. • They will be able to apply various statistical formula to calculate mean deviation, standard deviation standard error, coefficient of variation , from given biostatic problems. • They will be able to understand the merit and demerit of measures of central tendency. • The will be able to define correlation, regression, correlation coefficient,

			• They will be able to compare correlation and regression. • They will be able to draw the different type of correlation by using scatterd diagram method. • They will be able to draw the regression line by using regression equation. • They will be able to calculate correlation coefficient from given statistical data. • They will be understand about null and alternate hypothesis. • They will be able to apply student t-test to calculate the difference between the means of two sample. • They will be able to calculate F value From given statistical problems. • They will be able to apply the chi square formula to decide whether the hypothesis good fit or not,or association between two events .
Semester I (Gen)	Generic Elective 1 DSC -Core Course1 BOTHGEC01T BOTGCOR01T	Five kingdom classification, concept about prokaryotes,General character of bacteria cell structure and reproduction of bacteria and virus, general character of algae,its pigment, few characters of algal class, General character of Fungi and their several classes, lichen, General character of bryophytes, pteridophytes and gymnosperms. Knowledge on alteration of generation.	• Students will be able to classify the virus and bacteria on the chart paper. • They will be understood about the microbial mode of reproduction. • They will identify and classify various types of bacteria through its morphological feature or according to its cell structure under the microscope. • They could be stained the bacterial spore and easily understand its internal structure. • They will identify and classify various types of bacteria through its morphological feature or according to its cell structure under the microscope. • They could be stained the bacterial spore and easily understand its internal structure. • To apply their knowledge students can identify the algal genus like *Nostoc,Volvox,Oedogonium,Polysiphonia,Fucas etc*. • Students will be able to understand the Sexual and asexual spore of Fungi . • Students will be able to draw the Life cycle pattern of various fungi. • Student will be able to know the symbiotic relationship and how fungi involves in this relationship • Students will be able to get an idea about the Concepts on archegoniates • Students will be able to understand the Water to land transition and their adaptations. • Students will be able to classify the petridophytes and gymnosperms • Student will be able to identify the different types of bryophytes, pteridophytes and gymnosperm. • Students will be able to identify the gametophytic and sporophytic generation, reproduction and alteration of generation of *Riccia and Marchantia, Psilotum, Selaginella*, *Equisetum Cycas, Pinus etc.*
Semester II (Gen)	Generic Elective 2 DSC -Core Course 2 BOTHGEC02T	Environment, Biotic and abiotic components and their interactions,	• Students will be able to get an Idea on soil forming process

	BOTGCOR02T	Basic knowledge on ecology, ecosystems, food web, food chain and ecological pyramids. Concept of classification, Idea about the herbarium, botanical garden. Idea about binomial nomenclature.	• Students will be able to make a list of biological and chemical components of soil • Students will be able to understand the How plants adapt to the varied light, temperature and wind conditions of their environment. An understanding on how biotic organisms interact with their abiotic counterparts • Students will be able to draw the energy flow in an ecosystem • Students will be able to realize that how the fundamental radicals move through the biotic and abiotic components of earth • Students will be able to get an idea about the Productivity of an ecosystem and A basic concept of ecosystem and its components • Students will be able to get an idea about about the stages of plant succession • Students will be able to understand the brief knowledge on theory of continental drift and endemism • Students will be able to classify the different phytogeographical zones of India and their vegetations & Knowledge of Biomes. • Students will be able to understand the Concept of taxonomy,systematic. • Students will be able to make a chart of the Types of classification. • Students will be able to understand the Significance of herbarium and botanical garden. • Students will able to understand the valid publication method, author citation. • Students will be able to get an idea about Concept of hierarchy & Species concept • Students will be able to describe the Principles of ICBN • Students will be able to make a chart of the different Nomenclatural Types • Students can draw and understand the cluster analysis, phenogram, cladogram.
Semester III (Gen)	Generic Elective 3 DSC -Core Course3 BOTHGEC03T BOTGCOR03T	Internal anatomical tissue system present in root, stem and leaf of angiosperm. Concept about the male and female gametophyte and embryo formation.	• They will be able to understand the internal tissue system present in an angiospermic plant body. • They will be able to draw the different kind of vascular cambium. • They will be able to identify all xylem element under the microscope. • They will be able to compare between heart wood and sap wood. • They will be able to identify the stomatal type under the microscope. • Students will be able identify the distribution of tissue system through hand sectioning of plant material. • Student will be able compare the anatomical structure of dicot and monocot plants. • They will be able understand the organization of root apex. • Students will be able to explain Tunica Corpus theory & Korper kappe theory

			. • Students will be able to understand the structure of ovule and anther. • Students will be able to classify the ovule on the basis of its structure. • They will be able to identify the ovule, pollen grain, endosperm and embryo under the microscope, • They will able to explain the double fertilization process. • They will be able to identify dicot and monocot embryo under the microscope. • They will be able to apply their knowledge in fruit production. • They will be able to understand the self Incompatibility phenomenon. • They will be able to draw the egg apperatus and different kind of endosperm. • They will be able to summarize the process of embryo development. • They will be able to realize the relationship between endosperm and embryo. • They will be able to describe megagametogenesis process. • They have an clear idea about the pollination and how different agents are helps in cross pollination. • They will be able to compare the different kind of female gametophyte. • They will be able to an clear idea about apomixis and polyembryoni.
	Skill Enhancement Course 1 Course code: BOTSSEC01M	Basic knowledge on ecology, Environment, Biotic and abiotic components and their interactions, biodiversity and conservtion	• Students will be able to get detailed idea about species diversity, genetic diversity and ecosystem diversity. • They will be able to understand values and uses of biodiversity. • They will be able to understand loss of biodiversity and management strategies. • They will be able to get an detailed idea of conservation of biodiversity • They will be able to understand the role of plants in relation to human welfare like importance of forestry, ornamental plants, avenue trees, alcoholic beverages, fruits and nuts, woods.
Semester IV (Gen)	Generic Elective 4 DSC -Core Course 4 BOTHGEC04T BOTGCOR04T	Concept about water,internal structure and function of root, stomata, function and component of conductive tissue ,Recall the name of different kind of plant hormones, Recall the name of some minerals required for nutrition. Concept of photosynthesis, respiration, nitrogen metabolism.	• They will be able to understand the pathway of water from root hair cell to vascular bundle. • They will be able to realize the role of different trans-membrane protein in the process of transportation and absorption. • They will be able to compare the active and passive transport mechanism. • They will be able to identify the deficiency of minerals in their surrounding flowering and cultivated plants. • They will be able to make a list of minerals required in plant nutrition. • They will be able to explain the phloem loading and unloading mechanism. • They will be able to understand the role of phytochrome in short day and long day plant for its flowering

			• They will be able to xplain the bioassay of auxin, gibbereline, cytokinin, and ethylene and ABA. • They will be able to understand the source sink relationship • They will be able to explain photomorphogenesis process. • They will be able to compare PSI and PSII. • They will able to recall the name of photosynthetic and accessory pigmnents. • They will be able to separate the photosynthetic pigments. • They will be able to present chematically the C4,C3,CAM and C2 cycle. • Students will be able to interpret the light reaction. • They will be able to count ATP molecule originate during respiration. • They will be able to perform an experiment to compare the rate of respiration in different parts of a plant. • They will be able to represent the flowchart of Glycolysis, TCA cycle,oxidative pentose phosphate pathway. • They will be able to understand the mitochondrial electron transport. • They will be able to understand ATP synthesis mechanism. • Students will be able to understand the process of biological nitrogen fixation in non legume and legumes. • They will be able to explain ammonia assimilation process.
	Skill Enhancement Course 2 Course code: BOTSSEC02M	Concept of medicinal uses of plants, identification, classification and nomenclature of angiosperms.Herbarium .	• Students will get an idea about ethnobotany • They will acquire the knowledge on methodology of Ethnobotanical studies like Field work, Herbarium, Ancient Literature, Archaeological findings, temples and sacred places. • They will understand the role of enthnobotany in modern medicine • They will get an idea about the Significance of plants in ethno botanical practices
Semester V (Gen)	Discipline Specific Elective 1 BOTGDSE01T	An idea about cell, cell organalle, idea about the mitotic and meiotic cell division. DNA structure, Genetic material DNA, Replication , Central Dogma, Transcription and translation .	• They will be able to understand about the structure of prokaryotic and eukaryotic cell and cell organelles and their role. • They will be able to understand the origin of eukaryotic cell. • They will be able to draw cell cycle and different stages of cell division. • They will be able to identify the different stages of divisional stages under the microscope. • They will be able to get an idea about checkpoint. • They could also understand the structure of any type of plant cell under microscope. • Students will be able to understand the Genetic material is DNA – Conformed,not RNA or Protein. • Students will be able to draw Structure of DNA

			• Students will be able to draw and compare the Nitogenous bases of DNA,RNA • Students will be able explain the Operon Model both lactose and tryotophan. Also know about attenuation process. • Students will be able to understand the Central Dogma • Students will be able an idea about different enzymes and proteins involved in replication process. • Students will be able to understand the Chromatin Structure & types • Students will be able to explain the RNA modification process • Students will be able to describe the structure of Mt and Cp DNA • Students will be able to understand the Concept of Exon and Intron • Students will be able to understand the Semiconservative mode of replication • Students will be able compare the Different types of replication in virus, bacteria and eukaryotes • Students will be able to understand the Translation process in prokaryotes and eukaryotes • Students will be able get an idea about Salient features of Genetic Code • They will be able to describe the transcription process found in both prokaryotes and eukaryotes.
	Skill Enhancement Course Course code:3 BOTSSEC01M	Basic knowledge on ecology, Environment, Biotic and abiotic components and their interactions, biodiversity and conservtion	• Students will be able to get detailed idea about species diversity, genetic diversity and ecosystem diversity. • They will be able to understand values and uses of biodiversity. • They will be able to understand loss of biodiversity and management strategies. • They will be able to get an detailed idea of conservation of biodiversity • They will be able to understand the role of plants in relation to human welfare like importance of forestry, ornamental plants, avenue trees, alcoholic beverages, fruits and nuts, woods.
Semester VI (Gen)	Discipline Specific Elective 2 BOTGDSE04T	Concept about the microscope, recall the uses of electron microscopy, chi square test,	• Students will be able to get an idea about the structure and principle of fluorescence and confocal microscopy. • They will be able to understand the reason of use of fluorochromes in flow cytometry and fluorescence microscopy. • They will be able to describe the steps of sample preparation for electron microscopy. • They will be able to compare between TEM & SEM, • They will be able to understand about chromosome painting technique, freeze etching technique cryo-fixation and their application. • Students will be able to get an idea about centrifugation technique using sucrose density

			gradient,CsCl2 density gradients, ultracentrifugation for cell fractionation. • They will be able to understand the role of radioisotope in auto radiography and biological research. • They will be able to demonstrate Pulse Chase experiment. • Students will be able to describe the principle and application of spectrophotometry in biological research. • They will be able to understand the principle of different kind of chromatography and their uses in separation of biomolecules. • They will be able to get an idea about yhe structure, principle and application of Mass spectrometry, X-ray crystallography and X-ray diffraction. • They will be able to get an idea about different kind of electrophoresis technique using in separation of protein,dna ,rna molecule. • They will be able to demonstrate the experiment of separation of protein by PAGE and separation of DNA by AGE. • They will be able to estimate the protein concentration by Lowry method. • Students will be able to define biostatistics, variables,sample. • They will be able to understand the limitation and uses of statistics. • They will be able to understand the methods of data collection procedure. • They will be able to compare primary and secondary data. • They will be able to classify the methods of sampling. • They will be able to define mean,mode,median,measure of central tendency. • They will be able to calculate mean,mode,median, geometric mean from statistical problem • They will be able to apply the chi square formula to decide whether the hypothesis good fit or not.
	Skill Enhancement Course 4 Course code: BOTSSEC02M	Concept of medicinal uses of plants, identification, classification and nomenclature of angiosperms.Herbarium .	• Students will get an idea about ethnobotany • They will acquire the knowledge on methodology of Ethnobotanical studies like Field work, Herbarium, Ancient Literature, Archaeological findings, temples and sacred places. • They will understand the role of enthnobotany in modern medicine • They will get an idea about the Significance of plants in ethno botanical practices

Course specific outcome: Department of Bota