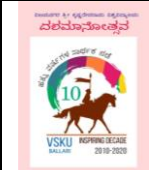




VIJAYANAGARA SRI KRISHNADEVARAYA UNIVERSITY

Jnana Sagara Campus, BELLARY - 583 105.

DEPARTMENT OF BOTANY



Department of Studies in Botany

2019-20

Programme Outcomes (POs):

At the end of the programme students will be able to:

PO1: Take research in central or state research institutes as JRF, SRF, RA ,Scientific officer, lab technician or teaching as their career.

PO2: To create their own career opportunities in govt./private sectors like pharmaceutical industry, herbal companies, or can start their own business in the field of extraction

PO3: The students will be qualified to face IFS, CSIR-NET, SET, GATE, ICMR.NET, ICAR.NET etc

Course Outcomes (COs):

I Semester

Title of the Course with Code: BOT: HCT. 1.3 Plant Systematic and Economic Botany

After completion of this course students will be able to

CO	Statement
CO1	➤ Understand and gain adequate knowledge about Plant taxonomy and its importance in Plant scientific community maybe it procedure of collection, identification, nomenclature (IBN, ICNCP), classification, preparation of herbarium. Role of herbarium in Plant research and preparation of herbarium.
CO2	➤ Gain knowledge of role and importance of classical vs modern taxonomy (phylogeny). They will be updated with the recent system of classification (Angiosperm Phylogeny Group IV).
CO3	➤ Be able to categorize Rare, Endangered and Threatened plant species and conservation aspects of RET species. Diagnose the plants and assign them to their families.
CO4	➤ Understand role & importance of Botanical Gardens, methods of establishment of botanical gardens as per accepted system of classification.
CO5	➤ Gain expertise in cultivation and marketing of medicinal plants of local interest.
CO6	➤ Be able to understand the concepts in Flora writing like : preparation of dichotomous key which be enable them to classify the plants and assign them to their respective families, genus and species, subspecies level.

CO7	➤ Distinguish and understand specific roles of other branches of botany like anatomy, biochemistry, histology, embryology, cytology, molecular biology in relation to Plant taxonomy.
CO8	➤ Be overall enable to understand various updated technology which can be applied in the subject of botany and importance of plant taxonomy and its
CO9	➤ allied subjects in their day to day life.

Title of the Course with Code: BOT. HCT 1.1 Viruses, bacteria and fungi

After completion of this course students will be able to

CO	Statement
CO1	➤ Understand the diversity among Viruses, Bacteria, Algae and Fungi.
CO2	➤ Know the systematic, morphology and structure, of Bacteria, Viruses Algae and fungi.
CO3	➤ Understand the life cycle pattern of Bacteria, Viruses, Fungi and Algae.
CO4	➤ Identify and demonstrate the structural, physiological, and genetic similarities and differences of the major categories of microorganisms.
CO5	➤ Understand the useful and harmful activities of Bacteria, Viruses, Algae Fungi.

Title of the Course with Code: BOT. HCT. 1.2 Bryophytes, Pteridophytes and

Gymnosperms

After completion of this course students will be able to

CO	Statement
CO1	➤ Gain adequate knowledge on comparative account of different forms of plants forms: algae, Bryophytes, pteridophytes divisions
CO2	➤ Study and impart knowledge about the occurrence, distribution, structure and life history of lower plants such as algae, fungi, lichens, bryophytes, pteridophytes and gymnosperms
CO3	➤ Understand the phylogeny and evolutionary concepts of these organisms

Title of the Course with Code: HC-4 : BOT: SCT. 1.4.1 Ecology and Environment.

After completion of this course students will be able to

CO	Statement
CO1	➤ Understand role and importance of ecosystem and environment in sustaining plants, animals, microorganisms, including human beings.
CO2	➤ Be able to gain knowledge of energy flow in ecosystems, importance of biogeochemical cycles and precautionary measures to save ecosystem and other elements of environment which play a pivot role for sustainability of all living things
CO3	➤ Understand factors responsible for and measures for climate change. Distinguish between various plant communities.
CO4	➤ Be able to diagnose different types of soil, reasons for erosion and conservation of soil.
CO5	➤ Be well versed with technique and procedure of rain water harvesting.
CO6	➤ Be able to use GPS and GIS and remote sensing knowledge will give them field knowledge of plant habitat.
CO7	Use different Sampling methods for airborne microorganisms which include impingement, impaction, filtration. (Rotorad and Anderson sampler).

Title of the Course with Code: HC-4 : BOT: SCT. 1.4.2. Phytogeography and Evolution

After completion of this course students will be able to

CO	Statement
CO1	➤ Gain adequate knowledge in distinguishing and understanding various plant components of phytogeographical regions.
CO2	➤ Understand floristic diversity of India and world.
CO3	➤ Understand reasons and pattern of plant species migration, fragmentation etc. with respect to continental drift.
CO4	➤ Learn vegetational distributional pattern in India, Karnataka and HK region.
CO5	➤ Understand different mechanism of isolation, rate of speciation, genetic sequences, formation of species.
CO6	➤ Understand evolution of flowering plants and role of insects in origin of angiosperms.

II Semester

Title of the Course with Code: BOT.HCT. 2.1 Plant Anatomy & Embryology

After completion of this course students will be able to

CO	Statement
CO1	➤ Plant anatomy and embryology are much awaited subject to study the internal structures and structure & function of reproductive organs in plants.
CO2	➤ The student will be able to identify the key concepts of the structure and function of plant anatomy. Structure and Function of Organ Systems
CO3	➤ Students will be able to utilize embryological studies in various aspects like analysis of evolutionary trends, circumscription and delimitation of taxa and making a decision on systematic positions
CO4	➤ Also enlightened about the mechanism of pollination and basic structure of the embryo.

Title of the Course with Code: BOT. HCT. 2.2 Cell Biology and Genetics

After completion of this course students will be able to

CO	Statement
CO1	➤ Basic properties of cells (prokaryotic/ eukaryotic), Different Cell organelles (their structure and function), Cytoskeleton and cell motility, Cellular reproduction and cell signalling
CO2	➤ Understand the structure and chemical composition of chromatin and concept of cell division.
CO3	➤ Understand the relationship between phenotype and genotype in human genetic traits. Fundamental molecular principles of genetics. Study gene interactions.
CO4	➤ Describe the basics of genetic mapping also understand how gene expression is regulated.

Title of the Course with Code: BOT HCT. 2.3 Plant Breeding and Propagation

After completion of this course students will be able to

CO	Statement
CO1	➤ Learn various plant breeding techniques involved in crop improvement programmes like mass selection, pure line selection etc.
CO2	➤ Understand principles, techniques, and facilities used to propagate Crop Plants and ornamental plants.
CO3	➤ Learn various propagation techniques like Seed propagation, cuttings, grafting, budding, division, layering, and tissue culture.

Title of the Course with Code: BOT: SCT. 2.3.1 Microbial Technology**After completion of this course students will be able to**

CO	Statement
CO1	➤ Gain knowledge in handling microorganisms, staining techniques, sterilization techniques.
CO2	➤ Understand various microbes used in agriculture, dairy products, in food industry.
CO3	➤ Learn production of various enzymes viz., ethanol, citric acid etc. and production of nano particles.
CO4	➤ Beneficial algae and nutritional values of single cell protein.
CO5	➤ Learn technique of assessing the quality of water.

Title of the Course with Code: BOT.OET. 2.4 Biofertilizers and Biopesticides**After completion of this course students will be able to**

CO	Statement
CO1	➤ Helps understand the roles of Bio-pesticides and Bio-fertilizers are used widely by the agricultural society Biofertilizers supplement the requirements of fertilizers. Ability to distinguish the types of biofertilizers
CO2	➤ Biological Pesticides, are natural pest control agents that are obtained from natural substances
CO3	➤ Biofertilizers are live products (or latent cells of microbes) and require care in storage, transport, application and maintaining field conditions.
CO4	➤ Ability to distinguish the types of biofertilizers. These are eco-friendly and renewable resources.
CO5	➤ Accelerate some biochemical processes and make more nutrients available to the crops. This will improve seed germination and produce thicker roots.
CO6	➤ In the economy, bio-fertilizers are cost-effective and they also have low manufacturing costs, especially when it comes to nitrogen and phosphorus use
CO7	➤ To create self-employment opportunities

III Semester**Title of the Course with Code: BOT: HCT. 3.1 Plant Physiology****After completion of this course students will be able to**

CO	Statement
CO1	➤ Gain knowledge about properties , extraction and purification of enzymes produced by plants.
CO2	➤ Learn technique of Industrial production of Plant growth hormones: and learn a brief account of commercial applications of growth hormones. Membranes: Structure and organization; Transport across membranes- passive and active transport processes.
CO3	➤ Understand photosynthesis and respiration processes in plant in detail.
CO4	➤ Gain knowledge of Stress physiology: Stressful environment, Mechanism of plant responses to Drought and Cold stresses.

Title of the Course with Code: BOT. HCT. 3.2 Molecular Biology**After completion of this course students will be able to**

CO	Statement
CO1	➤ Understand the properties, structure and function of genes in living organisms at the molecular level
CO2	➤ Explain the significance of central dogma of gene action
CO3	➤ Have a conceptual knowledge about DNA as a genetic material, enzymology, and replication strategies
CO4	➤ Understand the molecular mechanisms involved in transcription and translation
CO5	➤ Describe the importance of genetic code and wobble hypothesis
CO6	➤ Discuss the molecular mechanisms underlying mutations, detection of mutations and DNA damage and repair mechanisms
CO7	➤ Explain the concept of recombination, linkage mapping and elucidate the gene transfer mechanisms in prokaryotes and eukaryotes
CO8	➤ Handle and independently work on lab protocols involving molecular techniques

Title of the Course with Code: BOT. HCT. 3.3 Genetic Engineering**After completion of this course students will be able to**

CO	Statement
CO1	➤ Learning tools and techniques in rDNA technology- DNA manipulative enzymes.
CO2	➤ Acquire skills on techniques of construction of recombinant DNA - Cloning vectors and isolation of gene of interest.
CO3	➤ Construction of genomic DNA library and cDNA library
CO4	➤ Learning various application of rDNA technology in evolving plants for resistance to pest and disease, tolerance to herbicides and abiotic factors.
CO5	➤ Learning techniques for production of pharmaceuticals, growth hormones, vaccines, gene therapy in expression system.
CO6	➤ Knowledge on environmental applications of genetic engineering through bioremediation.

Title of the Course with Code: Bot: SCT. 3.3.1 Methods in Plant Sciences**After completion of this course students will be able to**

CO	Statement
CO1	➤ Be able to handle and use different instruments used in plant science like hot air oven, autoclave, PCR, colorimeter, HPLC, TLC , centrifuge, column chromatography etc.
CO2	➤ Understand principles and handle instruments like spectroscopy, PCR, electrophoresis

Title of the Course with Code: BOT. OET. 3.4 Medicinal Plants**After completion of this course students will be able to**

CO	Statement
CO1	➤ Understanding the role of medicinal plants for animal and human welfare
CO2	➤ Botanical classification, crude drugs, isolation of the major components, chemical structures and uses of these substances - belonging to the groups of alkaloids, terpenoids, steroids, anthraquinones, of their derivatives and of their related compounds
CO3	➤ Medicinal plants are considered as a rich resource of bioactive compounds which can be used in drug development either pharmacopoeial, non- pharmacopoeial or synthetic drugs

IV Semester**Title of the Course with Code: BOT: HCT. 4.1 Plant Pathology and Plant Protection****After completion of this course student should be able to**

CO	Statement
CO1	➤ Understand disease concept in plants: Disease classification, Causal factors - biotic and abiotic, disease diagnosis, Koch's postulates.
CO2	➤ understand defense Mechanism and principles in plants: Structural and Biochemical. Genetics of Host – Pathogen interaction.
CO3	➤ Be aware of different methods of assessment of disease incidence and disease severity and estimation of yield loss.
CO4	➤ Various principles of plant disease control: Regulatory Methods: Plant quarantine regulation, inspection and certification, Physical Methods: Heat and cold treatment (Hot water, Hot air, Radiation treatment). Cultural Methods: Crop rotation, Flooding, Solarization, trap crops. Chemical Methods: Prophylactants and systemic chemicals. Methods of fungicide application. Seed and biological control methods.

Title of the Course with Code: BOT. HCT. 4.2 Plant Biotechnology**After completion of this course student should be able to**

CO	Statement
CO1	➤ Plant tissue culture including Regeneration methods morphogenesis, organogenesis and embryogenesis and Plant tissue culture types.
CO2	➤ Learn to troubleshoot the issues related to plant nutrition, quality improvement, environmental adaptation, transgenic crops and their use in agriculture
CO3	➤ Elucidate the significance of transgenic plants as bioreactors for the production of enzymes, plantibodies, edible vaccines and therapeutic proteins
CO4	➤ Address bioethical and biosafety issues related to plant transgenics
CO5	➤ Understand, conduct and gain a thorough knowledge to perform plant tissue culture experiments
CO6	➤ Develop and manage plant tissue culture techniques for crop improvement
CO7	➤ To utilize in vitro techniques in commercial production of crop plants
CO8	➤ Direct and indirect gene transfer methods in plants: microinjection, electroporation, particle bombardment, Agrobacterium mediated method - Tissue specific promoters, selectable and scorable markers, reporter genes- Molecular analysis of transgenic plants

Title of the Course with Code: BOT. SCT. 4.4.2 Medicinal and Aromatic Plants**After completion of this course student should be able to**

CO	Statement
CO1	➤ Study of medicinal plants is essential to know plants products and plant parts used for human welfare.
CO2	➤ Students will be able to identify medicinal plants (family/genus -level)
CO3	➤ State the phytochemical classification and memorize the main categories of active components, contained in medicinal plants
CO4	➤ The basic methods of extracting the active components from plants and how to identify them
CO5	➤ Define the concepts of ethnobotany and ethnopharmacology and memorize the geographical distribution of the most important pharmaceutical plants • Also understand the quality control methods of herbal medicinal products in perspective of safe use of plants for therapeutic purposes
CO6	➤ Medicinal plants, their parts and products used in folk medicine and on groceries of these in local markets. They are useful to treat ailments and possible side effects due to overdoses or misuses are also visualized.

Title of the Course with Code: BOT: SCT. 4.4.2 Biodiversity and Conservation**After completion of this course student should be able to**

CO	Statement
CO1	➤ Know various concepts of biodiversity with reference to plant diversity, RET plants, importance of conservation aspects of Important plants.
CO2	➤ Understand factors responsible for loss of biodiversity.
CO3	➤ Learn methods of in situ and ex situ conservation techniques.
CO4	➤ Biodiversity conservation Legal aspects: Legal aspects of biodiversity in India. Policy and priority setting.

Title of the Course with Code: BOT. HCMP 4.3 Hardcore Major Project**After completion of this course student should be able to**

CO	Statement
CO1	➤ To formulate a scientific question
CO2	➤ To present scientific approach to solve the problem
CO3	➤ To interpret, discuss and communicate scientific results in written form
CO4	➤ To gain experience in writing a scientific proposal
CO5	➤ Students learns tools and techniques in various modules on applied aspects of plant science.

B1. COURSE OUTCOMES

NAME OF THE DEPARTMENT : BOTANY

NAME OF THE PROGRAMME : DIPLOMA IN BOTANY

Title of the Course with Code: PGDECH P.G. Diploma in Medicinal Plants

Programme Outcomes (POs):

At the end of the programme students will be able to:

PO1: To understand significance and role of medicinal plants in human health and welfare.

PO2: Cultivate and marketing of medicinal plants

PO3: Become self reliant in growing, multiplication and providing employment.

Course Outcomes (COs):

Title of the Course with Code: PGDECH P.G. Diploma in Medicinal Plants

After completion of this course student should be able to

CO	Statement
CO1	➤ Students will be able to categorize plants into medicinal plants.
CO2	➤ Cultivate medicinal plants and act as consultant in cultivation and marketing of medicinal plants