Sanjivani Rural Education Society's
SANJIVANI ARTS, COMMERCE AND SCIENCE COLLEGE
At: Sahajanandnagar, Post: Shingnapur, Tal: Kopargaon,
Dist: Ahmednagar (M.S.) Pin:423603
Recognized by Govt. of Maharashtra, Affiliated to University of Pune, ID.No.PU/AN/ACS/130/2012

Department of Botany
Course Outcomes : M.Sc. Botany

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PLANT TAXONOMY - I (Bryophytes and Pteridophytes) Course Code – BOT 502 MJ**
On completion of the course, the students will be able to:	
CO1	Understand the origin, general characteristics, and affinities of bryophytes and pteridophytes, including their distribution, habitat, and life cycles.
CO2	Gain knowledge of the classification systems for bryophytes (e.g., G. M. Smith, R. M. Schuster) and pteridophytes (e.g., Sporne, A. R. Smith), and their significance in the study of plant taxonomy.
CO3	Explore the salient features, morphology, anatomy, and reproductive strategies of major groups within bryophytes (e.g., Marchantiales, Sphagnales) and pteridophytes (e.g., Psilopsida, Lycopsida, Sphenopsida).
CO4	Analyze the adaptations of bryophytes and pteridophytes to terrestrial life, including the evolution of the sporophyte and the significance of structures such as rhizoids and scales.
CO5	Understand the ecological roles and economic significance of bryophytes and pteridophytes, including their contributions to biodiversity, habitat stabilization, and potential applications in various industries.
CO6	Investigate the fossil record of pteridophytes to comprehend their evolutionary history and the development of seed habits, contributing to an understanding of plant evolution.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PLANT PHYSIOLOGY Course Code – BOT 503 MJ**
On completion of the course, the students will be able to:	
CO1	Comprehend the mechanisms of photosynthesis, including the structure and function of light-harvesting complexes.
CO2	Analyze the key metabolic pathways of respiration, including glycolysis, the citric acid cycle (Krebs cycle).
CO3	Understand the mechanisms of translocation of organic solutes in plants, focusing on the source and sink relationships, the loading and unloading processes of phloem, and the Munch hypothesis regarding solute transport.
CO4	Explore the definitions and types of plant stress, examining the physiological responses of plants to biotic stresses
CO5	Gain insights into the biosynthesis, storage, breakdown, and transport of plant hormones, specifically focusing on the physiological effects
CO6	Investigate the structure and function of photoreceptors involved in sensory photobiology, including phytochrome, cryptochrome, and phototropins, and understand their mechanisms of action in mediating plant responses to light.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PLANT BIOCHEMISTRY Course Code – BOT 504 MJ**
On completion of the course, the students will be able to:	
CO1	Comprehend the concepts of pH, pOH, and pKw, and apply the Henderson-Hasselbalch equation to biological systems.
CO2	Explore the biosynthesis and oxidation of fatty acids, including alpha-oxidation and beta-oxidation pathways, as well as the glyoxylate cycle's role in lipid metabolism and its implications for energy production and storage in plants.
CO3	Gain insights into the structure and functions of nucleotides, including their synthesis and degradation pathways.
CO4	Examine the role of primary and secondary metabolites in plants, focusing on the shikimate pathway and its significance in the biosynthesis of secondary metabolites such as terpenes, phenols, and nitrogenous compounds, and their ecological and economic importance.
CO5	Analyze the classification, structure, and properties of amino acids, alongside their biosynthesis with a focus on glutamine synthetase (GS) and glutamate synthase (GOGAT) in plants
CO6	Understand the structure and function of key proteins such as myoglobin, keratin, and hemoglobin, as well as the importance of hydropathy plots, Ramachandran plots, motifs, and folds in protein architecture.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**GREEN BELT AND GREEN CREDIT Course Code – BOT 505 MJ**
On completion of the course, the students will be able to:	
CO1	Comprehend the significance of green belts in urban planning and environmental sustainability, including their role in mitigating pollution, enhancing biodiversity, and improving overall ecosystem health.
CO2	Analyze the various ways plants contribute to pollution mitigation, including air quality improvement, carbon sequestration, and the role of specific plant species in phytoremediation.
CO3	Develop skills in modeling greenbelt systems and designing effective plantation layouts, focusing on species selection, spatial arrangement, and maintenance practices to maximize ecological and aesthetic benefits.
CO4	Gain practical knowledge in the nursery production and propagation techniques of greenbelt plants, including seed germination, vegetative propagation, and the management of nursery operations for successful plant establishment.
CO5	Understand the importance of tree legislation, including the Maharashtra Tree Act of 1975 and 2016, with a focus on tree census, conservation efforts, and the legal framework supporting urban forestry initiatives.
CO6	Evaluate the objectives and mechanisms of the Green Credit Programme, including its application in tree plantation, sustainable agriculture, waste management, air pollution reduction, and mangrove conservation, alongside the significance of eco-labeling (Ecomark) in promoting sustainable building practices.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 501 MJ and BOT 502 MJ Course Code – BOT 506 MJP**
On completion of the course, the students will be able to:	
CO1	Demonstrate proficiency in collecting algae using appropriate methods, and accurately describe and classify algae in technical terms, including the documentation of algal products and their significance.
CO2	Conduct detailed morphological observations, documentation, and classification of representative taxa from different algal groups (Cyanophyta, Chlorophyta, Phaeophyta, and Rhodophyta) with appropriate justification for their classification.
CO3	Identify and analyze the morphological characteristics and reproductive structures of selected fungi from various classes, demonstrating an understanding of their systematic position.
CO4	Develop identification keys for non-lichenized fungi and lichenized fungi, along with creating a fungal herbarium, to enhance skills in fungal classification and documentation.
CO5	Cultivate and evaluate the growth conditions and characteristics of an industrially important macro-fungus, gaining practical experience in mushroom cultivation techniques.
CO6	Study and document the morphology and anatomy of bryophytes, including the comparative anatomical analysis of sporophytes, to develop an understanding of their structure, function, and reproductive strategies.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 503 MJ and BOT 504 MJ Course Code – BOT 507 MJP**
On completion of the course, the students will be able to:	
CO1	Determine the chlorophyll a/b ratio in C3 and C4 plants to understand their photosynthetic efficiency and adaptations.
CO2	Apply paper chromatography to separate amino acids or sugars from phloem sap, enhancing skills in biochemical analysis and identification of plant metabolites.
CO3	Conduct experiments to study the effect of light intensity and bicarbonate concentration on O2 evolution during photosynthesis, reinforcing concepts of plant physiological responses to environmental factors.
CO4	Estimate proline levels in response to salt or drought stress, gaining insights into plant responses to abiotic stress and the role of osmoprotectants
CO5	Estimate proteins using the Bradford method and separate seed storage proteins by SDS-PAGE, developing skills in protein quantification and analysis.
CO6	Determine the activity of specific enzymes (Amylase, Catalase, or Peroxidase), applying knowledge of enzyme kinetics and regulation in plant systems.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**LANDSCAPE AND GARDENING** **Course Code – BOT 510 MJ**
On completion of the course, the students will be able to:	
CO1	Explain the fundamental concepts of landscape design, including the historical context, importance, and various elements that contribute to effective landscape development.
CO2	Identify and describe the various soft elements used in landscape gardening, including trees, shrubs, climbers, ground covers, and seasonal plants, and discuss their roles in enhancing aesthetic appeal.
CO3	Apply the principles of landscape gardening—such as focal points, unity, scale, and proportion—to create visually appealing and functional landscape designs.
CO4	Describe the significance of hard elements in landscape gardening, including walkways, pergolas, and water features, and their impact on overall design and usability.
CO5	Demonstrate proficiency in the landscape design process using grid systems, and create basic landscape plans using manual and computerized tools, including AutoCAD.
CO6	Develop strategies for the maintenance of landscaped areas and understand sustainable practices in landscape gardening to promote environmental health and resource conservation.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**POST HARVEST TECHNOLOGY OF COMMERCIAL CROPS** **Course Code – BOT 511 MJ**
On completion of the course, the students will be able to:	
CO1	Describe various harvesting techniques and best practices for minimizing post-harvest losses, including the significance of timing and methods for different horticultural crops.
CO2	Assess maturity indices using computational, physical, chemical, and physiological methods, and explain the role of plant growth regulators in pre-harvest practices to enhance post-harvest quality.
CO3	Identify post-harvest losses and treatments, including handling techniques and necessary care during harvesting, to ensure the quality and longevity of horticultural produce.
CO4	Evaluate post-harvest processing methods such as cleaning, sorting, grading, and value-added processing options (e.g., canning, juicing) to enhance product quality and shelf life.
CO5	Explain the principles of effective packaging operations, including materials and methods, and discuss handling and transportation systems that maintain produce quality and minimize damage.
CO6	Analyze quality and safety standards for fresh produce, including grading, quality assurance, and regulations, and evaluate the implementation of food safety practices such as HACCP to ensure compliance with food laws.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**BIODIVERSITY CONSERVATION AND UTILIZATION** **Course Code – BOT 512 MJ**
On completion of the course, the students will be able to:	
CO1	Define biodiversity and explain its importance in ecological balance, including its various components such as species diversity, genetic diversity, and ecosystem diversity.
CO2	Identify and describe the patterns of biodiversity, including mega-diversity countries, biodiversity hotspots, phytogeographic regions of India, and the significance of keystone and flagship species.
CO3	Evaluate the need for biodiversity conservation and compare different conservation strategies, including in-situ (protected areas, biosphere reserves) and ex-situ (seed banks, botanical gardens) methods.
CO4	Discuss organizations involved in biodiversity management and analyze policies and frameworks such as the Convention on Biological Diversity (CBD), CITES, and national legislation concerning biodiversity conservation.
CO5	Explain the concepts and strategies for the sustainable utilization of plant biodiversity, highlighting its importance in various sectors such as food, medicine, and aesthetic components.
CO6	Examine the relationship between biodiversity and various industries reliant on bioresources, assessing the source, processing, and end products in sectors such as food, fuel, and pharmaceuticals.

tional Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**INTEGRATED PEST MANAGEMENT (IPM)** **Course Code – BOT 513 MJ**
On completion of the course, the students will be able to:	
CO1	Define Integrated Pest Management (IPM) and explain its guiding principles, historical development, and significance in promoting sustainable pest management practices.
CO2	Identify common agricultural and non-agricultural pests, assess pest damage symptoms, and apply pest population monitoring techniques for effective management.
CO3	Analyze cultural and physical control methods, including crop rotation, habitat manipulation, and the use of physical barriers, and evaluate their effectiveness in pest management strategies.
CO4	Discuss the types and modes of action of pesticides and fungicides, including safe application techniques, and understand the principles of pesticide resistance management.
CO5	Examine the ecological interactions among pests, host plants, and natural enemies, and explore the role of biological control in integrated pest management systems.
CO6	Design and implement effective IPM programs based on decision-making processes, and evaluate economic, social, and environmental considerations to assess the impact of pest management strategies.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**SEED SCIENCE** **Course Code – BOT 514 MJ**
On completion of the course, the students will be able to:	
CO1	Define seed science and articulate its scope and importance in agriculture, distinguishing between seeds and grains, and identifying the characteristics of orthodox and recalcitrant seeds.
CO2	Describe the structure of seeds, including the embryo, endosperm, and seed coat, and analyze the chemical composition of seeds in terms of carbohydrates, proteins, oils, and fats.
CO3	Explain the types of seed legislation in India, the role of statutory bodies and agencies under the Seed Act of 1966, and outline the statutory requirements for the sale of seeds and penalties for violations.
CO4	Define seed dormancy and germination, categorize the types of dormancy, and discuss the causes and methods to break dormancy, along with the factors affecting seed germination, seed vigor, and viability.
CO5	Identify the characteristics of seed quality and apply various methods for testing seed quality, including germination tests, moisture testing, physical purity analysis, and biochemical tests.
CO6	Assess the mechanisms of seed transmission of diseases and pests, explore integrated management strategies for seed-borne diseases, and examine the impact of insect pests on various crops, detailing their life cycles, modes of infestation, and control measures.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 510 MJ** **Course Code – BOT 515 MJP**
On completion of the course, the students will be able to:	
CO1	Demonstrate the ability to identify and classify soft elements in landscape gardening, including trees, shrubs, climbers, and ground covers, as studied in theory.
CO2	Analyze and describe the various hard elements used in landscape gardening, such as walkways, benches, and water features, and their significance in landscape design.
CO3	Apply the principles of landscape gardening, including focal points, scale, and texture, to create cohesive and aesthetically pleasing landscape designs.
CO4	Explore and differentiate between various types of landscape gardening and their applications, enhancing understanding of their functional and aesthetic roles.
CO5	Participate in the landscape designing process, including the use of grids and computerized design tools, to create basic landscape plans.
CO6	Demonstrate practical skills in implementing landscape irrigation systems and maintaining landscape projects, ensuring their sustainability and health through appropriate maintenance practices.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 511 MJ** **Course Code – BOT 516 MJP**
On completion of the course, the students will be able to:	
CO1	Analyze and determine the maturity stages of commercially important crops, applying knowledge of growth indices and physical characteristics to assess optimal harvest times.
CO2	Demonstrate an understanding of various pre-cooling methods for agricultural commodities, evaluating their effectiveness in prolonging shelf life and maintaining quality.
CO3	Develop practical skills in the grading and sorting of agricultural commodities, utilizing appropriate techniques to classify products based on quality, size, and maturity.
CO4	Execute the process of applying wax coatings to agricultural commodities, understanding its role in enhancing appearance and extending post-harvest life.
CO5	Conduct quality evaluations of different agricultural commodities using standardized testing methods to assess freshness, taste, and nutritional content.
CO6	Engage in the preparation of value-added products from fruits and vegetables, demonstrating skills in product development, preservation, and packaging techniques.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 512 MJ** **Course Code – BOT 517 MJP**
On completion of the course, the students will be able to:	
CO1	Determine the minimum size of the sampling unit necessary for effectively studying specific plant communities, utilizing statistical methods to ensure representative sampling.
CO2	Evaluate species richness and calculate similarity and diversity indices in different plant communities, applying methodologies to interpret ecological data.
CO3	Conduct a comprehensive study of vegetation utilizing diversity indices such as Simpson's Index and Shannon-Weiner Index, interpreting results to assess community structure and health.
CO4	Perform a case study on an in-situ conserved species, documenting its ecological significance, conservation status, and the strategies employed for its protection.
CO5	Investigate and report on an ex-situ conserved species, detailing its preservation methods, genetic diversity, and importance for biodiversity conservation.
CO6	Observe and document various aspects of a selected keystone species (e.g., Ficus or Bombax), analyzing its ecological roles and implications for ecosystem health.

National Education Policy 2020 M.Sc. Botany, Part - I (Semester - I)	
Title of the Course and Course Code	**PRACTICAL BASED ON BOT 513 MJ** **Course Code – BOT 518 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and describe symptoms of various plant diseases, demonstrating an understanding of the basic concepts and terminology related to plant pathology.
CO2	Explain the morphological features and life cycles of different plant pests and parasites, illustrating their impact on plant health and productivity
CO3	Apply techniques for the identification of plant nematodes, using morphological characteristics to differentiate between species and assess their effects on host plants.
CO4	Analyze the methods of pesticide application and assess safety protocols, evaluating their effectiveness in integrated pest management strategies.
CO5	Calculate and formulate appropriate concentrations of fungicide sprays, integrating knowledge of chemical properties and application methods to enhance disease control efforts.
CO6	Evaluate and select appropriate media for isolating fungi and bacteria, conducting experiments to assess the viability of different pathogens and implementing preservation techniques for disease specimens.

National Education Policy 2020
M.Sc. Botany, Part - I (Semester - I)

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 514 MJ** **Course Code – BOT 519 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and describe the structures of monocot and dicot seeds, demonstrating an understanding of their anatomical features and functions.
CO2	Explain the processes involved in different types of seed germination (epigeal, hypogeal, and viviparous), illustrating the physiological changes that occur during each type.
CO3	Apply techniques to break seed dormancy and conduct a Grow Out Test (GOT) to assess seed viability and performance under controlled conditions.
CO4	Analyze various seed germination testing methods (paper, soil, and sand), evaluating their effectiveness in determining seed quality and viability.
CO5	Conduct biochemical tests (Quick viability test, Peroxidase, and Phenol color test) to assess seed quality, integrating knowledge of seed physiology and biochemistry.
CO6	Evaluate the impact of important seed-borne fungi on seed health and identify pest species affecting fiber crops, pulses, vegetables, and stored grains, assessing control measures through laboratory and field observations.

Title of the Course and Course Code	**RESEARCH METHODOLOGY** **Course Code – BOT 541 MN**
On completion of the course, the students will be able to:	
CO1	Define key concepts related to research methodology, including types of research, significance, and criteria for good research.
CO2	Explain the process of selecting and defining a research problem, including the techniques involved in this critical first step of research.
CO3	Formulate a clear and testable research hypothesis based on specific research questions and objectives, distinguishing between different types of hypotheses.
CO4	Conduct a literature review to identify gaps in existing research and assess various referencing styles, demonstrating the ability to synthesize information from multiple sources.
CO5	Design a research proposal that includes the methodology for data collection, interpretation, and report writing, effectively utilizing tools for data analysis and presentation.
CO6	Critically evaluate the impact factor of scientific journals and the significance of citations in research, understanding their role in enhancing the credibility and visibility of research work.

Title of the Course and Course Code	**PRACTICALS BASED ON BOT 541 MN** **Course Code – BOT 542 MNP**
On completion of the course, the students will be able to:	
CO1	Demonstrate the ability to write a comprehensive literature review and reference using appropriate citation styles, showcasing understanding of scholarly communication.
CO2	Explain the process of creating visual representations of data (graphs such as line, bar, and pie charts) using MS Excel, and interpret the significance of these visualizations in research.
CO3	Compose a well-structured abstract for a research article using MS Word, effectively summarizing the research objectives, methodology, results, and conclusions.
CO4	Perform statistical analyses, including mean, mode, median, standard deviation, coefficient of variation, T-test, Chi-square test, and ANOVA, using relevant data sets and interpret the results
CO5	Prepare a detailed research outline and present it using MS PowerPoint, demonstrating the ability to organize and communicate research ideas effectively.
CO6	Assess the originality of a document by utilizing plagiarism detection software (such as Turnitin or Urkund) and file a patent form, understanding the importance of intellectual property rights in research

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SANJIVANI
GROUP OF INSTITUTES

National Education Policy 2020
M.Sc. Botany, Part - I (Semester - II)

Title of the Course and Course Code	**PLANT TAXONOMY - III (Paleobotany and Gymnosperms)** **Course Code – BOT 551 MJ**
On completion of the course, the students will be able to:	
CO1	Define key terms related to paleobotany and gymnosperms, including fossil types (impression, compression, petrifaction), geological time scale, and gymnosperm classifications.
CO2	Explain the processes of fossil formation and the significance of fossils in studying plant evolution, as well as the affinities of gymnosperms with pteridophytes and angiosperms.
CO3	Analyze and describe the external and internal morphology of selected fossil groups (e.g., Psilopsida, Lycopsida, Sphenopsida) and gymnosperm orders (e.g., Cycadales, Coniferales) to identify their evolutionary traits.
CO4	Compare the distribution and economic importance of gymnosperms worldwide and in India, identifying conservation strategies for economically significant species.
CO5	Assess the ecological roles of gymnosperms and their adaptations to various environments throughout geological time, evaluating their contributions to biodiversity.
CO6	Design a comprehensive report on a selected fossil group or gymnosperm species, integrating morphological, anatomical, and ecological data, and present findings effectively using visual aids.

Title of the Course and Course Code	**TAXONOMY OF ANGIOSPERMS** **Course Code – BOT 552 MJ**
On completion of the course, the students will be able to:	
CO1	Define key terms and concepts related to plant systematics, including taxonomy, nomenclature, classification, and the major contributions of historical figures in Indian botany.
CO2	Explain the principles and history of the International Code of Nomenclature, detailing important rules, governance, and the significance of hybrid names in plant taxonomy.
CO3	Illustrate the taxonomic structure and hierarchy, demonstrating the application of the taxonomic concepts (alpha and omega taxonomy) through the identification of plant species.
CO4	Compare and contrast various systems of classification, such as Linnaeus's artificial system, Bentham and Hooker's natural system, and the phylogenetic system outlined in APG IV, analyzing their impact on modern taxonomy.
CO5	Assess the morphological variations, systematic positions, and economic importance of selected plant families (e.g., Asteraceae, Orchidaceae) based on Bentham and Hooker and APG-IV classifications.
CO6	Develop a comprehensive taxonomic study of a selected plant family, integrating morphological, economic, and ecological information while adhering to the principles of nomenclature and classification.

Title of the Course and Course Code	**CYTOGENETICS AND PLANT BREEDING Course Code BOT 553 MJ**
On completion of the course, the students will be able to:	
CO1	Define key concepts in cytogenetics and plant breeding, including karyotyping, linkage mapping, mutation types, and the objectives of plant breeding.
CO2	Explain the structure and organization of chromosomes, the significance of karyotypes in plant species identification, and the historical context and objectives of plant breeding in India.
CO3	Demonstrate techniques of cytogenetics, such as slide preparation and analysis, and apply gene mapping methods like two-point and three-point test crosses in practical scenarios.
CO4	Analyze the mechanisms and consequences of mutations and chromosomal variations (duplication, inversion, translocation) and evaluate their impact on genetic diversity and breeding strategies.
CO5	Compare and contrast the methods of pureline selection, mass selection, and clonal selection, assessing their advantages, disadvantages, and historical achievements in the context of crop improvement.
CO6	Design a breeding program incorporating heterosis and inbreeding depression principles, integrating strategies for self-incompatibility and male sterility to enhance hybrid seed production.

Title of the Course and Course Code	**MOLECULAR BIOLOGY** **Course Code – BOT 554 MJ**
On completion of the course, the students will be able to:	
CO1	Identify and define key concepts related to DNA degrading and modifying enzymes, DNA packaging, and the processes of transcription and translation.
CO2	Explain the mechanisms and significance of DNA replication, including the roles of various enzymes and factors involved in prokaryotic and eukaryotic replication.
CO3	Demonstrate the processes of DNA damage repair pathways, such as nucleotide excision repair, base excision repair, and mismatch repair, and their importance in maintaining genomic integrity.
CO4	Compare and contrast the transcription mechanisms in prokaryotes and eukaryotes, including the roles of different RNA types (mRNA, rRNA, tRNA) and the structure and function of the spliceosome.
CO5	Assess the significance of gene regulation mechanisms, including positive and negative regulation, using examples such as the lactose, tryptophan, and arabinose operons to illustrate their functional roles in cellular processes.
CO6	Design an experimental approach to investigate the effects of specific DNA damaging agents on replication fidelity and the efficiency of repair mechanisms in a selected model organism.

Title of the Course and Course Code	**PHARMACOGNOSY** **Course Code – BOT 555 MJ**
On completion of the course, the students will be able to:	
CO1	Define key concepts in pharmacognosy, including the historical background, classification of crude drugs, and the scope of medicinal and aromatic plants.
CO2	Explain the factors affecting the cultivation and collection of medicinal plants, differentiating between exogenous and endogenous factors, as well as the role of plant growth regulators and pest management.
CO3	Demonstrate methods for detecting adulteration in herbal drugs, including sampling procedures, determination of foreign matter, and detection of contaminants such as heavy metals and microbial presence.
CO4	Compare and contrast various extraction methods and chromatographic techniques, such as TLC, HPLC, and HPTLC, for the purification of phytochemicals, focusing on the selection of solvents and the principles of each method.
CO5	Assess the impact of ethnobotany and ethnopharmacology on herbal drug evaluation and traditional medicine, discussing the significance of reverse pharmacology in the context of drug development.
CO6	Design a pharmacognostic study for selected herbal drugs (e.g., Isabgol, Aloes, Digitalis), incorporating aspects of source identification, cultivation practices, macroscopic character evaluation, and applications in pharmacotherapy

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 551 MJ and BOT 552 MJ** **Course Code – BOT 556 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and describe various fossil types (impression, compression, petrifaction, coal ball) and significant paleobotanical specimens (e.g., Rhynia, Lyginopteris, Pentoxylon, Nipaniophyllum, Lepidodendron) using slides and specimens.
CO2	Explain the morphological, anatomical, and reproductive characteristics of selected Gymnosperm taxa (e.g., Cycadales, Coniferales, Gnetales) through observation of live material, herbarium specimens, or permanent slides.
CO3	Conduct a detailed study of selected angiosperm families according to Bentham and Hooker's classification system, including identifying one example from each series and conducting identification exercises on two unknown local plant specimens.
CO4	Prepare artificial, indented, or bracketed keys for the identification of at least ten unknown specimens, demonstrating the application of taxonomic principles and nomenclature issues such as author citation and the principle of priority
CO5	Assess and articulate the process of describing a new taxon, including the deposition of type specimens, Latin diagnosis, and the use of standard abbreviations in citations, as well as the significance of effective and valid publication.
CO6	Compile and present a comprehensive field study report that includes field notes, preparation of herbarium sheets from field trips around the college campus, and submission of at least 25 correctly identified herbarium specimens representing a minimum of 20 different families.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 553 MJ and BOT 554 MJ** **Course Code – BOT 557 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and describe the procedures for preparing cytological stains and fixatives, as well as the methods for isolating prokaryotic DNA, genomic DNA, and RNA from plant materials.
CO2	Explain the techniques used for studying the external morphology of metaphase chromosomes and meiotic configurations in plant tissues, including the significance of karyotype analysis in plant identification.
CO3	Execute the process of performing numerical problems related to gene mapping using two-point and three-point test crosses, as well as analyzing Neurospora tetrad data to demonstrate understanding of genetic linkage.
CO4	Compare and contrast the morphological characters of induced polyploid plants with control plants, demonstrating an understanding of the effects of colchicine on plant development.
CO5	Assess the viability of pollen from major crops through floral biology studies and critically evaluate the effectiveness of hybridization techniques used in cotton and maize breeding.
CO6	Design and implement a comprehensive molecular biology experiment involving the isolation and quantification of seed storage proteins from leguminous seeds, utilizing techniques such as SDS-PAGE for protein separation and analysis.

Title of the Course and Course Code	**HYDROPONICS TECHNOLOGY** **Course Code – BOT 560 MJ**
On completion of the course, the students will be able to:	
CO1	Define hydroponics technology and its historical background, including the types of hydroponics systems and their applications in modern agriculture.
CO2	Explain the role of essential mineral elements in plant nutrition, identify deficiency symptoms for key nutrients (N, P, Ca, Mg, K, S, Fe, Mn, Cu, Zn, B, Mo), and discuss how environmental factors affect plant growth in hydroponics.
CO3	Formulate nutrient solutions for hydroponics systems by selecting appropriate fertilizers and adjusting pH levels, and demonstrate the ability to monitor and analyze nutrient concentrations in hydroponic setups.
CO4	Evaluate various hydroponic cultivation techniques (e.g., NFT, Ebb and Flow, Deep Water Culture) and assess their effectiveness for specific crops like tomatoes, chilies, and spinach, considering factors such as growth conditions and resource efficiency.
CO5	Analyze the challenges of hydroponics entrepreneurship, including family, social, technological, financial, and policy factors, and appraise the role of government in supporting small-scale hydroponics industries.
CO6	Develop a marketing strategy for hydroponically grown products that encompasses harvesting, grading, storage, and distribution, while understanding the global hydroponic market and opportunities for commercial production.

Title of the Course and Course Code	**POST HARVEST MANAGEMENT OF NTFPs (Non-Timber Forest Products)** **Course Code – BOT 561 MJ**
On completion of the course, the students will be able to:	
CO1	Define key concepts related to Post-Harvest Management and Non-Timber Forest Products (NTFPs), including their importance and relevance in sustainable forestry and rural livelihoods.
CO2	Explain the scope and significance of NTFPs in relation to livelihood sources, and describe the processes of collection, primary processing, and marketing of NTFPs.
CO3	Identify and analyze the sources, uses, cultivation methods, and conservation strategies for bamboo and cane, demonstrating practical knowledge of their ecological and economic importance.
CO4	Compare and contrast various methods of extraction for essential and non-essential oils, evaluating their classification, storage requirements, and applications in industries such as cosmetics and food
CO5	Assess the factors affecting gum formation and the uses of gums and resins, including the identification of important gum-yielding plants and their contributions to the economy.
CO6	Develop strategies for the sustainable management of NTFPs, incorporating traditional knowledge, intellectual property rights (IPRs), and the role of organizations and institutions in promoting sustainable practices within the NTFP sector.

Title of the Course and Course Code	**PLANT RESOURCE MANAGEMENT and GEO- SPATIAL TECHNIQUES Course Code – BOT 562 MJ**
On completion of the course, the students will be able to:	
CO1	Identify and define key concepts related to the origin and economic importance of cultivated plants, including N. I. Vavilov's Centres of Origin and various plant resource categories.
CO2	Explain the utility and exploitation of plant resources across different sectors, such as food, fiber, medicine, and energy, with specific examples illustrating their economic significance.
CO3	Demonstrate practical knowledge of sustainable development principles by proposing strategies for the conservation and sustainable utilization of plant resources in various environmental contexts.
CO4	Analyze the principles of remote sensing and GIS techniques, including image acquisition and classification, to evaluate land cover changes and monitor environmental resources.
CO5	Assess the role of GPS technology in data collection and its integration with GIS, evaluating the effectiveness of these tools in mapping and monitoring plant resources and conservation efforts.
CO6	Develop case studies showcasing the application of geo-spatial techniques in plant conservation, including ethical considerations and emerging trends in geo-spatial technology for effective resource management.

Title of the Course and Course Code	**PLANT MICROBES INTERACTION Course Code – BOT 563 MJ**
On completion of the course, the students will be able to:	
CO1	Define key concepts related to endophytic fungi, symbiotic relationships of microbes with plants, and the mechanisms of plant-pathogen interactions.
CO2	Explain the roles of arbuscular mycorrhizal fungi, rhizobia, and root-associated bacteria in promoting plant growth and their interactions with plants under stress conditions.
CO3	Demonstrate practical knowledge of isolating and identifying nematodes and their antagonistic microbes, employing techniques for studying plant-parasitic nematodes and nematophagous interactions.
CO4	Analyze the mechanisms of bacterial pathogenesis in plants, including quorum sensing, effector proteins, and plant immune responses, using case studies of specific bacterial diseases such as bacterial blight in pomegranate.
CO5	Assess the impact of phytopathogenic fungi on plants by examining their life cycles, pathogenic mechanisms, and the role of plant hormones in defense, with a focus on diseases like corn smut.
CO6	Develop integrated pest management strategies based on the interactions between phytophagous insects and plants, including the role of reactive oxygen species and plant lectins, to propose effective biological and chemical control measures.

Title of the Course and Course Code	**SEED TECHNOLOGY** **Course Code – BOT 564 MJ**
On completion of the course, the students will be able to:	
CO1	Define seed technology, its scope, and importance, including key terms and concepts related to seed production and certification.
CO2	Describe the history and evolution of the seed industry in India, including the roles of various organizations such as the National Seeds Corporation Limited and private seed enterprises.
CO3	Implement seed production techniques, including artificial pollination methods and hybrid seed production strategies, demonstrating the ability to conduct general procedures for seed production.
CO4	Evaluate the role of seed inspectors, including their powers, duties, and the procedure for conducting field inspections at various crop stages, assessing the impact of inspections on seed quality.
CO5	Assess different seed sampling methods and their purposes, including the significance of primary, composite, submitted, and working samples in the context of seed certification and quality assurance.
CO6	Design a seed processing unit layout, outlining the steps involved in seed processing from receiving to storage, including the benefits of seed treatment and proper packing techniques.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 560 MJ** **Course Code – BOT 565 MJP**
On completion of the course, the students will be able to:	
CO1	Recall the steps involved in the preparation of stock solutions of macro and micronutrients essential for hydroponic systems.
CO2	Explain the composition and significance of Hoagland's solution in hydroponic cultivation, including its role in providing essential nutrients to plants.
CO3	Demonstrate the process of germinating lettuce seedlings or any commercial plant under controlled hydroponic conditions, applying knowledge of seed germination techniques.
CO4	Evaluate the growth and health of lettuce or any commercial plant cultivated in a hydroponic NFT system, comparing it to traditional soil-based cultivation methods.
CO5	Design and implement a hydroponic Dutch bucket system for the cultivation of tomato or another suitable plant, incorporating best practices for nutrient management and plant support.
CO6	Conduct a field visit to an industry or institute specializing in hydroponics, analyzing the demonstration of hydroponic techniques and their applications in commercial agriculture.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 561 MJ** **Course Code – BOT 566 MJP**
On completion of the course, the students will be able to:	
CO1	Identify non-timber forest products (NTFPs) along with their respective sources, demonstrating knowledge of their origins and ecological significance.
CO2	Analyze and describe the maturity stages of commercially important NTFPs, explaining how these stages impact harvesting and market value.
CO3	Demonstrate the pre-cooling methods for locally available wild fruits, applying techniques to maintain freshness and extend shelf life.
CO4	Conduct grading and sorting of various NTFPs, such as gums, herbs, and wild vegetables, assessing quality and suitability for market standards.
CO5	Prepare value-added products from NTFPs, such as food supplements, nutraceuticals, or energy drinks, showcasing skills in product development and innovation.
CO6	Visit and evaluate a plant-based processing unit or cold storage/export unit, analyzing operational methods and quality standards required for exporting agricultural and NTFPs commodities.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 562 MJ** **Course Code – BOT 567 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and classify food plants, including one example each from cereals, fruits, and nuts, demonstrating foundational knowledge of their characteristics and uses.
CO2	Describe and compare the properties and uses of two fodder crops, two fiber crops, and two aromatic plants, elucidating their economic and ecological importance.
CO3	Conduct a study of plants used in the beverage industry, medicinal applications, narcotics, and natural dyes, applying techniques to analyze their significance in various sectors.
CO4	Analyze plants used in the sugar and starch industry, energy-producing plants, and ornamental plants, examining their cultivation practices and market relevance.
CO5	Utilize QGIS tools for effective management, data linking, and toolbox functions, assessing the software's application in vegetation mapping and analysis.
CO6	Develop a GIS database and execute vegetation mapping using GPS and GIS, applying satellite image processing techniques such as digital image classification, NDVI monitoring, and ecological data acquisition for a specific locality.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 563 MJ** **Course Code – BOT 568 MJP**
On completion of the course, the students will be able to:	
CO1	Prepare basic growth media, including Potato Dextrose Agar (PDA) and Nutrient Agar, demonstrating foundational knowledge of culture media used for cultivating bacteria and fungi.
CO2	Describe isolation and sub-culturing techniques for bacteria and fungi, illustrating the procedures and their importance in microbiological studies.
CO3	Isolate Rhizobium from root nodules of a leguminous plant and demonstrate practical skills in handling and culturing symbiotic microorganisms.
CO4	Perform Gram staining to differentiate between Gram-positive and Gram-negative bacteria, analyzing the significance of these classifications in microbiology.
CO5	Study the effect of different antibiotics on bacterial growth, evaluating the results to assess the efficacy of each antibiotic in inhibiting bacterial proliferation.
CO6	Conduct histochemical staining to observe Arbuscular Mycorrhizal Fungi (AMF) colonization in roots, and prepare a report detailing the methodology and significance of AMF in plant health.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 564 MJ** **Course Code – BOT 569 MJP**
On completion of the course, the students will be able to:	
CO1	Identify and classify flowers adapted for pollination by various agents (wind, insects, and birds), demonstrating foundational knowledge of plant reproductive strategies.
CO2	Describe physical, chemical, and biological methods to protect crop plants from pests and diseases, explaining the principles and applications of each method.
CO3	Demonstrate the use of systemic and contact pesticides with suitable examples, including precautionary measures, to ensure safe application practices in crop protection
CO4	Observe and analyze walking patterns during field inspections to assess crop health and pest damage, developing critical observational skills in agricultural management.
CO5	Interpret and evaluate seed tags, including Foundation Seed, Truthful Labeled Seed, and Certified Seed tags, to understand the implications of seed quality and regulatory compliance.
CO6	Design a seed treatment protocol utilizing traditional methods and chemical protectants to prevent pest attacks, synthesizing knowledge from pest management practices.

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SANJIVANI
GROUP OF INSTITUTES

National Education Policy 2020
M.Sc. Botany, Part - II (Semester - III)

Title of the Course and Course Code	**ADVANCED TAXONOMY OF ANGIOSPERMS – I** Course Code – BOT 601A MJ
On completion of the course, the students will be able to:	
CO1	Students are acquainted with the importance of classification in Angiosperms.
CO2	They will get the knowledge of primitive and advanced groups of Angiosperms.
CO3	This course helps to make them aware of taxonomic structure of Angiosperms.
CO4	Different systems of classification will be studied by them.

Title of the Course and Course Code	**CYTO-GENETICS AND PLANT BREEDING – I** Course Code – BOT 601B MJ
On completion of the course, the students will be able to:	
CO1	Explain the organization and complexity chromosome
CO2	Understand the nature of chromosomal abnormalities
CO3	Know the principle and procedure of breeding in plant science..

Title of the Course and Course Code	**PLANT PHYSIOLOGY – I** Course Code – BOT 601C MJ
On completion of the course, the students will be able to:	
CO1	Understand important water relation of plants with respect to various physiological processes
CO2	Student will know the significance of Photosynthesis, Structure and properties of water, Bioenergetics, Nutrient uptake
CO3	Student will learn about the process of plant growth and their mechanism. Also, will know about the basic principles of plant growth and development, metabolism.
CO4	Student will know about the flowering and seed physiology
CO5	Understand the concepts and applications of photoperiodism and vernalization

Title of the Course and Course Code	**HERBAL DRUG TECHNOLOGY-I** **Course Code – BOT 601D MJ**
On completion of the course, the students will be able to:	
CO1	Know the different types of plant constituent.
CO2	Understand the importance, types and properties of Phyto-constituents.
CO3	Isolate the Phyto-constituent from plant.

Title of the Course and Course Code	**SEED SCIENCE & TECHNOLOGY-I** **Course Code – BOT 601E MJ**
On completion of the course, the students will be able to:	
CO1	Students will be able to identify the field crops
CO2	The concept of organic farming will be useful for ecofriendly agriculture.
CO3	Botanical, bacterial and fungal pesticides will be useful to produce organic food.
CO4	Use of synthetic herbicides will be avoided
CO5	Vegetable seed production concept will be helpful for students in seed industries

Title of the Course and Course Code	**APPLIED ECOLOGY & ENVIROMENT** **Course Course Code – BOT 601F MJ**
On completion of the course, the students will be able to:	
CO1	Comprehend Fundamental Ecological Principle
CO2	Analyze Population and Community Ecology.
CO3	Evaluate Environmental Pollution and Its Mitigation.
CO4	Promote Biodiversity and Conservation Strategies.

Title of the Course and Course Code	**ADVANCED MYCOLOGY AND PLANT PATHOLOGY – I** **Course Course Code – BOT 601G MJ**
On completion of the course, the students will be able to:	
CO1	Understand different aspects of fungi i.e. structure, nutrition, systematics, phylogeny, ecology, physiology etc.
CO2	Classify the fungi in accordance with their distinguishing characters, thallus structure, reproduction and life cycle.
CO3	Recognise various concepts of plant pathology.
CO4	Explain host parasite interaction and genetics of disease resistance.

Title of the Course and Course Code	**ADVANCED TOOLS AND TECHNIQUES IN PLANT SCIENCES** **Course Code – BOT 602 MJ**
On completion of the course, the students will be able to:	
CO1	Students will demonstrate proficiency in operating a range of advanced instruments and techniques, including microscopy, chromatography, spectroscopy, electrophoresis, and radiolabeling, ensuring accurate data acquisition and analysis
CO2	Students will be able to integrate knowledge from various disciplines such as physics, chemistry, biology, and engineering to understand the principles underlying advanced plant science techniques and their applications in interdisciplinary research
CO3	Graduates will possess the necessary skills to design, execute, and analyze experiments using advanced plant science techniques, contributing to the advancement of knowledge in areas such as plant physiology, biochemistry, genetics, and environmental science.
CO4	Students will be aware of the ethical considerations and safety protocols associated with the use of advanced tools and techniques in plant sciences, ensuring responsible conduct in research and minimizing risks to themselves, others, and the environment.

Title of the Course and Course Code	**INTELLECTUAL PROPERTY RIGHT'S (IPR)** **Course Code – BOT 603 MJ**
On completion of the course, the students will be able to:	
CO1	To gain comprehensive understanding of various intellectual property laws, including patents, trademarks, copyrights, and trade secrets, with a specific focus on how these laws apply to protecting intellectual property in the context of breeding and agriculture.
CO2	To acquire knowledge of the principles and mechanisms of breeders' rights systems, including the scope of protection, application procedures, and enforcement mechanisms.
CO3	To develop the ability to critically evaluate the ethical and socio-economic implications of intellectual property rights and breeders' rights, particularly in relation to issues such as access to genetic resources, biodiversity conservation, farmer's rights, and the rights of indigenous communities.
CO4	To apply legal principles related to intellectual property rights and breeders' rights to practical scenarios in the context of agriculture, biotechnology, and plant breeding.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 601G MJ** **Course Code – BOT 604 MJP**
On completion of the course, the students will be able to:	
CO1	Compare different life forms of fungi with respect to their morphology and reproductive characters.
CO2	Apply mycological techniques for identification of fungi.
CO3	Analyse plant diseases appearance by using Koch's postulate.
CO4	Examine the Mycorrhizal association in plant roots.

Title of the Course and Course Code	**ADVANCED HORTICULTURAL TECHNIQUES** **Course Code – BOT 610 MJ**
On completion of the course, the students will be able to:	
CO1	To understand the importance and horticultural crops
CO2	Describe the Agro techniques in horticulture
CO3	Understanding the micropropagation techniques
CO4	Understanding the post-harvest technology

Title of the Course and Course Code	**NURSERY AND PTC TECHNIQUES** **Course Code – BOT 611 MJ**
On completion of the course, the students will be able to:	
CO1	Know the importance of Nursery based business.
CO2	Develop the in-vitro plants and their significance.
CO3	Methods of different mode of reproduction in plants.

Title of the Course and Course Code	**NURSERY AND PTC TECHNIQUES** **Course Code – BOT 611 MJ**
On completion of the course, the students will be able to:	
CO1	Know the importance of Nursery based business.
CO2	Develop the in-vitro plants and their significance.
CO3	Methods of different mode of reproduction in plants.

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National Education Policy 2020
M.Sc. Botany, Part - II (Semester - IV)

Title of the Course and Course Code	**ADVANCED TAXONOMY OF ANGIOSPERMS – II** **Course Code – BOT 651A MJ**
On completion of the course, the students will be able to:	
CO1	Identify and classify the plants..
CO2	. Handle the laboratory based molecular tools for the taxonomy.
CO3	Prepare the herbaria for documentation.

Title of the Course and Course Code	**CYTO-GENETICS AND PLANT BREEDING – II** **Course Code – BOT 651B MJ**
On completion of the course, the students will be able to:	
CO1	Understand the cell cycle progression
CO2	Know the importance of structure and function of chromosome.
CO3	Handle the molecular technique for genetic mapping
CO4	Explain the importance of hybridization.

Title of the Course and Course Code	**PLANT PHYSIOLOGY – II** **Course Code – BOT 651C MJ**
On completion of the course, the students will be able to:	
CO1	Understand the role of macro- and micronutrients, their mode of availability to the plants, deficiency and toxicity symptoms.
CO2	Recognize the importance of Carbon assimilation in Photorespiration
CO3	Generalize the concepts of transport of water, minerals, and organic substances
CO4	Student will learn about water relations, mineral nutrition and crop physiology, Photosynthesis, Respiration
CO5	Interpret the biology of Nitrogen fixation.
CO6	Know about the basic principles of plant growth and development, metabolism
CO7	Familiarize the basic understanding of physiology of seed dormancy and Germination, Growth and Photo-physiology Physiology of Fruit Ripening

Title of the Course and Course Code	***HERBAL DRUG TECHNOLOGY – II*** ***Course Code – BOT 651D MJ***
On completion of the course, the students will be able to:	
CO1	Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants
CO2	To Understand concept of Ethnobotany and Ethno-pharmacology and its role in drug development.
CO3	Various nutraceuticals/herbs and their health benefits.
CO4	The requirements for setting up the herbal/natural drug industry.
CO5	The guidelines for quality of herbal/natural medicines and regulatory issues..
CO6	Know about the basic principles of plant growth and development, metabolism
CO7	Familiarize the basic understanding of physiology of seed dormancy and Germination, Growth and Photo-physiology Physiology of Fruit Ripening

Title of the Course and Course Code	**SEED SCIENCE AND SEED TECHNOLOGY – II** **Course Code – BOT 651E MJ**
On completion of the course, the students will be able to:	
CO1	Students will be able to identify the crop diseases and suggest the control
CO2	Students will be able to identify the varieties
CO3	Methods of seed health testing will be useful in seed industries
CO4	Know the plant breeder rights

Title of the Course and Course Code	**APPLIED ECOLOGY AND ENVIRONMENT – II** **Course Code – BOT 651F MJ**
On completion of the course, the students will be able to:	
CO1	Understand and Analyze Species Interactions and Ecosystem Classification
CO2	Evaluate Climate Change, Policies, and Sustainability Measure
CO3	Explore Environmental Microbial Ecology and Its Applications
CO4	Conduct Environmental Impact Assessment (EIA) and Environmental Auditing

Title of the Course and Course Code	**ADVANCED MYCOLOGY AND PLANT PATHOLOGY – II** **Course Code – BOT 651F MJ**
On completion of the course, the students will be able to:	
CO1	Recognize fungal association with plants, also understand their applied aspects.
CO2	Apply knowledge of mycology in fields such as industry, food and medical aspects
CO3	Understand plant diseases and their managements.
CO4	Execute the plant disease management through integrate approach.

tle of the Course and Course Code	**BIOINFORMATICS AND BIO-STATISTICS** **Course Code – BOT 652 MJ**
On completion of the course, the students will be able to:	
CO1	Students will able to implement the knowledge of bioinformatics for the advanced studies in plant sciences.
CO2	Prediction and data validation of the hypothesis for futuristic studies.
CO3	Crucial interpretation of the data on the basis of statistical analyses.
CO4	Acquire employable skills for advanced data processing
CO5	Improve the quality of the research.

Title of the Course and Course Code	**PRACTICAL BASED ON BOT 651G M** **Course Code – BOT 653 MJP**
On completion of the course, the students will be able to:	
CO1	Implement mycological methods to isolate fungi, soil nematodes and infected plant leaves.
CO2	Estimate minimum inhibitory concentration and salt on fungal growth..
CO3	Examine fungal growth and effect of temperature on fungal growth.
CO4	Understand plant diseases according to their symptoms, causal organisms.

Title of the Course and Course Code	**GREEN NANO-TECHNOLOGY** **Course Code – BOT 661 MJ**
On completion of the course, the students will be able to:	
CO1	Define the nanomaterial and know the importance of nanomaterials.
CO2	Understand the utilization process of nanomaterials in medical science
CO3	Explain the structure of nanomaterials

Title of the Course and Course Code	**GREEN NANO-TECHNOLOGY** **Course Code – BOT 661 MJ**
On completion of the course, the students will be able to:	
CO1	Define the nanomaterial and know the importance of nanomaterials.
CO2	Understand the utilization process of nanomaterials in medical science
CO3	Explain the structure of nanomaterials