

ACADEMIC CALENDER 2022-23
DEPARTMENT OF BOTANY
MAHARAJA BIJLI PASI GOVT. P.G. COLLEGE, ASHIYANA, LUCKNOW

NAME OF TEACHER: DR. VINAY KUMAR PRAJAPATI

DESIGNATION: ASSISTANT PROFESSOR

S.No.	Class/ Semester	Paper	Unit	Topic	Monthly Plan/ Weekly Plan	Teaching Pedagogy	Learning Outcome	Any Other Details
1	BSc-I SEM	I, BOT-101T /MINOR	UNIT-I	Nature, classification and structure (helical and icosahedral symmetry) of plant viruses; Symptoms (external & internal) of virus infected plants; Transmission of plant viruses; Genome organization and replication of tobacco mosaic virus; Techniques in plant virology - purification, serology and electron microscopy; Structure and replication of bacteriophage; Structure and replication of viroids.	Min 2 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			UNIT-II	Overview of cell structure and function in the prokaryotes (Bacteria and Archaea); Classification of prokaryotes based on cell structure (Archaea, Gram-positive and Gram-negative bacteria, Mollicutes); Metabolic diversity of bacteria (phototrophy, chemolithotrophy, autotrophy, heterotrophy, fermentation); Bacterial cell division and microbial growth; Bacterial genome and plasmids; Variability in bacteria: Mutation and genetic recombination; Microbial growth control; Bacterial culture and staining; Economic importance of bacteria.	Min 2 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-102P	UNIT-I	Instruments & Techniques <input type="checkbox"/> Laboratory safety and good laboratory practices <input type="checkbox"/> Principles and application of Laboratory instruments- microscope, incubator, <input type="checkbox"/> autoclave, centrifuge, Laminar air flow cabinet, filtration unit, shaker, pH meter. <input type="checkbox"/> Buffer preparation & titration <input type="checkbox"/> Cleaning and Sterilization of glasswares <input type="checkbox"/> Preparation of media- Nutrient Agar and Broth <input type="checkbox"/> Inoculation and culturing of bacteria in Nutrient agar and nutrient broth <input type="checkbox"/> Preparation of agar slant, stab, agar plate <input type="checkbox"/> Phenol Coefficient method to test the efficacy of disinfectants	Min 2 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
			UNIT-II	Symptoms of plant virus infection, and Bacterial Identification <input type="checkbox"/> Study the external symptoms of plant virus infection	Min 2 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion

				<input type="checkbox"/> Study of morphological forms of bacteria <input type="checkbox"/> Gram-staining of bacteria <input type="checkbox"/> Cultural characteristics of bacteria on nutrient agar <input type="checkbox"/> Pure culture techniques <input type="checkbox"/> Biochemical characterization of bacteria: Carbohydrate fermentation test, Mannitol motility test, Gelatin liquefaction test, Urease test, Nitrate reduction test, Catalase test, Oxidase test, Starch hydrolysis, Casein hydrolysis.				
2	BSc-III SEM	Paper-IV	Unit-II	Systematics: Taxonomic study of following families and their economic importance: Dicots: Acanthaceae, Amaranthaceae, Apiaceae, Apocynaceae, Asteraceae, Bombacaceae, Brassicaceae, Caesalpiniaceae, Convolvulaceae, Cuscutaceae, Cucurbitaceae, Euphorbiaceae, Lamiaceae, Malvaceae, Mimosaceae, Myrtaceae, Nelumbonaceae, Nymphaeaceae, Papilionaceae, Ranunculaceae, Rosaceae, Rubiaceae, Rutaceae, Scrophulariaceae, Solanaceae. Monocots: Arecaceae, Cyperaceae, Liliaceae and Poaceae	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Paper-IV Practical	Unit-II	Study of representative members of important taxonomic families of angiosperms with regard to their habit, inflorescence, floral characters along with floral diagrams and formulas	Min 2 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
3	BSc-V SEM	Paper-VII	Unit-I	Carbohydrates: classification, structure and properties of- monosaccharides (aldose and ketose sugars); oligosaccharides (reducing and non-reducing sugars); polysaccharides (storage- starch, inulin; structural- cellulose, pectin, chitin, aminoglycans, peptidoglycans, glycoprotein, glycolipids).	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-II	Lipids: classification, structure and properties of- fatty acids (saturated and unsaturated); simple lipids, compound lipids and derived lipids. Vitamins: structure and properties of vitamins.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Amino acids: classification, structure and properties of amino acids, essential and non-essential amino acids. Proteins: classification, structural organization of proteins, biological roles of proteins.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	Enzymes: general structure; active sites; action specificity; mode of action; aspects of enzyme kinetics (Michaelis-Menten constant); enzyme inhibition, factors affecting catalytic efficiency of enzyme. Bioenergetics: Laws of	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods &	To understand these concepts	Evaluation through Assignments and Discussion

				thermodynamics; concept of Gibb's free energy in plants; redox reactions; high energy rich compounds.		Interactive Sessions		
		Paper-VII Practical	Unit-I	Experiments on enzyme (catalase) activity and various factors affecting it; isolation of proteins and carbohydrates and their qualitative tests; isoelectric point determination, solubility of proteins and lipids.	Min 3 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
4	MSc-I SEM	BOT-CC-101	Unit-I	Development of Microbiology Bacterial and Archaeal groups based on molecular Bacterial cell structure and function of cell compo Bacterial genome structure, plasmids, replication,	Min 6 Lectures And Remedial & Tutorial	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-II	Nutritional types of bacteria and anoxygenic photosynthesis, Biological nitrogen fixation Antibiotics and their mode of action, bacterial resistance to antibiotics, Methods of genetic recombination in bacteria	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Nomenclature and classification of plant viruses Particle morphology and genome organization of tobacco mosaic tobamovirus (TMV), brome mosaic bromovirus (BMV), and cauliflower mosaic caulimovirus (CaMV) Hypersensitivity in host-virus interaction Molecular aspects of virus-vector relationship in transmission	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	Replication of TMV and CaMV, Gene expression strategies in plant viruses Structure, replication and pathogenicity of viroids, Life cycle of lytic and lysogenic bacteriophage	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	Purification of plant viruses, Virus detection by serological and nucleic acid hybridization methods, Modern methods of plant virus disease control, Role of microbes in recombinant DNA technology	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-104	Unit-III	Classification, Distribution, Evolutionary tendencies and Economic importance of Gymnosperms Pteridospermales: A general account of the order with reference to families- (i) Lyginopteridaceae (ii) Medullosaceae (iii) Glossopteridaceae (iv) Corystospermaceae (v) Peltaspermales (vi) Caytoniaceae Cycadales: A general account Nilssoniales: A general account. Bennettitales (Cycadeoideales): A general account,	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

				affinities and inter-relationships among the families (i) Williamsoniaceae (ii) Wielandiellaceae (iii) Cycadeoideaceae Pentoxylales: A general account and evolutionary tendencies				
			Unit-IV	Cordaitales: A general account of the order with reference to families- (i) Eristophytaceae (ii) Cordaitaceae (iii) Poroxyaceae Ginkgoales: A general account with special reference to <i>Ginkgo</i> Coniferales: Evolution of megastrobilus and seed-scale complex in various families. Study of various fossil genera, their reported structures with reference to families- (i) Lebachiaceae (ii) Voltziaceae (iii) Palissyaceae Comparative morphological anatomical and reproductive studies in living genera with reference to families- (i) Pinaceae (ii) Araucariaceae (iii) Taxodiaceae (iv) Cupressaceae (v) Cephalotaxaceae (vi) Podocarpaceae. Taxales: A general account with special reference to <i>Taxus</i>	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	Gnetales - A general comparative account with reference to <i>Ephedra</i> , <i>Gnetum</i> and <i>Welwitschia</i> (Affinities and inter-relationships, morphology, anatomy and reproductive biology)	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-VC-101	Unit-IV	In situ conservation - Protected areas, National parks, Wildlife sanctuaries, Biosphere reserves, Sacred forests Ex situ conservation- Seed banks, Sacred groves, Botanical gardens Cryopreservation, Natural reserves, Marine parks, Gene banks	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	Global strategy for plant conservation (GSPC), Model for plant development conservation and sustainable use Conservation programmes –Non-governmental organizations (NGOs), Governmental bodies - UNEP, DST, MoEF, FSI, CPCB, NMPB, AYUSH	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-105	Based on BOT-CC-101 & BOT-104	Practical Based on BOT-CC-101 & BOT-104	Min 6 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion

5	MSc-III SEM	BOT-CC-205	Unit-IV	Characteristics of communities, methods of study (Life forms, growth form and biological spectrum) and classification of plant communities. Population dynamics: Principles of population regulation. Phytogeography: Vegetational zone, important forest types of India. Interpretative Phytogeography, Principles and concepts of plant distribution.	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-301	Unit-II	Photochemistry and Photosynthesis: Historical background and action spectra, Photosynthetic pigments and light harvesting complexes, Photosystem I and II, Photolysis of water. Mechanism of electron transport: Photophosphorylation-cyclic, non-cyclic, Proton transport and ATP synthesis in chloroplast- ATP synthetase. Carbon assimilation: Calvin cycle, Photorespiration (C2 Cycle) and C4 cycle and their regulation; CAM pathway; Photosynthetic responses to light, CO ₂ and temperature, Synthesis of starch and sucrose.	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Respiration: Aerobic and anaerobic respiration, Glycolysis, Pentose phosphate Pathway, Krebs' Cycle and their regulation, Substrate level Phosphorylation. Gluconeogenesis, Glyoxylate cycle. Electron Transport System and ATP synthesis: NADPH DH in plant mitochondria, F ₁ -F ₀ ATPase, Alternate oxidase system, Chlororespiration. Lipid Metabolism: Lipid Metabolism: Synthesis of fatty acids (saturated and unsaturated) and lipids (phospholipids). α , β and ω oxidation	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-EL-301A	Unit-I	<ul style="list-style-type: none"> Fermented food products, probiotics Industrial applications of microbes: organic acids, amino acids, vitamins, enzymes and extremozymes; Immobilized enzyme technology Biopesticides and biofertilizers Microbial leaching and bioremediation 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	<ul style="list-style-type: none"> Lichens as pioneer colonizers Role of Lichens in monitoring pollution Lichens as food and fodder Therapeutic applications of lichens Lichen synthesis 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-EL-302A	Unit-I	<ul style="list-style-type: none"> Introduction to mushrooms and historical perspectives Classification of mushrooms, Nutritional and dietary values of mushrooms as source of proteins, carbohydrates, fibres, vitamins and minerals, 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

				therapeutic properties, mushroom collections from field.				
			Unit-II	<ul style="list-style-type: none"> Mushroom cultivation techniques: Erections of mushroom culture sheds and maintenance (tools, equipment and prerequisites). Fungal Isolation techniques, preparation of mother culture- pure culture, selection of stock, spawn production – mother spawn production. 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-IER-301	Unit-I	<ul style="list-style-type: none"> Plants in Homeopathy (plant parts and uses) Plants in Ayurveda (plant parts and uses) Plants in Allopathy (plant parts and active principals, uses) Ethnomedicine 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	<ul style="list-style-type: none"> Vermicomposting, green manuring Biofertilizers and use of biocontrol agents Biopesticides, pheromones Organic food and human health 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-302	Practical	Practical based on BOT-CC-301	Min 8 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
		BOT-IN-301	Summer Internship	Summer Internship	Min 8 Lectures	Field work and Lectures	To understand these concepts	Evaluation through assignments and Group Discussion
6	BSc-II SEM	BOT-201T/MINOR	Unit-III	General characters, affinities, classification of Gymnosperms; Morphology, anatomy, development and reproduction in Cycadales- Cycas, Coniferales- Pinus	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	Morphology, anatomy, development and reproduction in Ephedrales- Ephedra	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-202P	Unit-III	Gymnosperms Cycas- Habit, coralloid root and coralloid and normal root T. S., T. S. of leaflet and Rachis, Cycas- Micro and mega sporophyll, male cone V. S., micro sporophyll T. S. , entire and V. S. of ovule (slides only) Pinus- Branch of indefinite growth, spur shoot, T. S of old stem and needle R . L .S and T. L. S. of stem Pinus- Male and female cone, V .S. of male and female cone Ephedra- Habit, stem T. S (young and mature), leaf T. S, male and female	Min 2 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion

				strobilus, V. S. of male and female cone, ovule V. S. and seed (slides only)				
7	BSc-IV SEM	Paper-V	Unit-II	Salivary gland, lampbrush and B chromosomes. Cell division – mitosis, meiosis and their significance, Principles of inheritance, incomplete dominance, co-dominance, Gene interaction- Complementary gene interaction, Epistasis, Duplicate gene interaction	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Linkage, Linkage map (basic concept) Extrachromosomal Inheritance-variegation in four o'clock plant; shell coiling in snail; kappa particles in <i>Paramecium</i> .	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Paper-VI	Unit-II	Enzymes: discovery, classification and characteristics of enzymes. Photosynthesis: photosynthetic pigments; photochemical reactions- reaction centres, O ₂ evolution, photophosphorylation; CO ₂ fixation - C ₃ and C ₄ carbon cycle, CAM plants, photorespiration and glycolate metabolism, factors affecting photosynthesis.	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Respiration: aerobic and anaerobic respiration; respiratory pathways- glycolysis, Krebs cycle, pentose phosphate pathway; electron transport, oxidative phosphorylation, cyanide resistance . Lipid metabolism: fatty acid synthesis and its oxidation (α and β).	Min 2 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Practical	Based on paper v & vi units	Practical Based on paper v & vi units	Min 2 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
8	BSc-VI SEM	Paper-IX	Unit-II	Ecosystem: Concepts and components. Kinds of ecosystems; Food chains, webs and ecological pyramids. Plant community and Plant succession - hydrosere, xerosere etc.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Soil science: soil formation, profile development; soil composition. Properties of soil (Texture, density, temperature, organic matter, soil pH, ion exchange) Soil types of India.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Paper-X	Unit-IV	Etiology of viral, bacterial, fungal and insect-pest diseases. Mosaic diseases on tobacco and cucumber, yellow vein mosaic of bhindi, citrus canker, potato scab, little leaf of brinjal, damping off of seedlings, late blight of potato, red rot of sugarcane. Integrated pest disease management.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

		Paper-XI	Unit-I	Nucleic acid as genetic material. Structure and properties of nucleic acids and their functions. Replication of DNA in Prokaryotes and Eukaryotes. Cell cycle.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-II	Central Dogma and Genetic code. Transcription in Prokaryotes and Eukaryotes. Processing and modification of RNA, Structure of t RNA.	Min 3 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Practical	Based on paper IX, X & XI units	Practical Based on paper IX,X & XI units	Min 3 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
9	MSc-II SEM	BOT-CC-201	Unit-II	General morphology of floral parts, floral meristem, Formation of floral organs and their morphological nature, Genetics of floral organ differentiation, Homeotic mutants in Arabidopsis and Antirrhinum, Accessory floral organs: Epicalyx, Involucre, Cupule, Corona, Nectaries Epigyny, Origin, history and evolution of Angiosperm flower	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-III	Microsporogenesis: Structure, function and development of male gametophyte Megasporeogenesis: Types of ovules, their evolution and ontogeny, organization and development of embryo sac, involvement of genes/gene functions during Megagametogenesis Sexual incompatibility: Barriers to fertilization and methods to overcome sexual incompatibility, pollen tube structure and growth, Dioecism.	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-202	Unit-IV	Sexual dioecism; Interesting taxonomic features and inter-relationships of following Dicot families: Acanthaceae, Aizoaceae, Amaranthaceae, Asclepiadaceae, Asteraceae, Betulaceae, Bombaceae, Cactaceae, Caesalpiniaceae, Capparaceae, Caryophyllaceae, Casurinaceae, Cucurbitaceae, Ericaceae, Euphorbiaceae, Fagaceae, Fumariaceae, Malvaceae, Mimosaceae, Nelumbonaceae, Nymphaeaceae, Papaveraceae, Papilionaceae, Passifloraceae, Polygonaceae, Primulaceae, Ranunculaceae, Rosaceae, Rubiaceae, Scrophulariaceae, Tiliaceae, Trochodendraceae. Special features of Insectivorous/Parasitic and Saprophytic families..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

			Unit-V	Origin and evolution of Angiosperms Interesting taxonomic features and inter-relationships of following Monocot families and treatment of monocots in evolutionary systems of classification: Alismataceae, Arecaceae, Commelinaceae, Cyperaceae, Liliaceae, Orchidaceae, Poaceae, and Zingiberaceae. Ethnobotany- Its concepts, relevance and ethnic uses, Biodiversity and its conservation.	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-203	Unit-I	Chromosome structure, nucleosome, solenoid and packaging of DNA, molecular organization of centromere and telomere, nucleolus, euchromatin and heterochromatin, karyotype analysis, banding patterns, special chromosomes-polytene chromosomes, lampbrush chromosomes, B chromosomes., Nucleic acids, Nuclear DNA content, C-value paradox, unique, moderately repetitive and highly repetitive DNA, conformation of nucleic acids (A, B, Z DNA), DNA sequencing and amplification Linkage and Recombination: Concept and Types of Linkage, Three point test crosses, Molecular mechanism of recombination..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-II	Mendelian inheritance and interaction of genes: Complementary, Epistasis, Inhibitory, Duplicate, Polymeric, Lethal and Additive interaction of genes., Cytoplasmic Inheritance: Cytoplasmic inheritance involving chloroplast (Mirabilis jalapa, Zea mays) and Mitochondria (petite yeasts and cytoplasmic male sterility in higher plants).	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	DNA Replication: Mechanism of prokaryotic and eukaryotic DNA replication, replication apparatus, Origin of replication, priming and DNA polymerases. Transcription: RNA polymerases and their role, transcription in prokaryotes and eukaryotes, RNA processing, Ribonucleoproteins, structure of RNAs.	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-204	Unit-II	Plant introduction: types of introduction, procedure, uses of plant introduction and organizations associated with introduction. Pure line selection, mass and progeny selection, procedure and achievements. Pedigree selection, recurrent selection and their applications. Role of mutation in plant breeding, isolation of useful mutants and major achievements. Role of polyploidy in crop improvement..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

			Unit-III	Hybridization- kinds of hybridization, procedure of hybridization, types of hybridization and utility of hybridization. Hybrid breeding in self- and cross-pollinated crops. Back cross breeding Types of hybrids – single cross hybrid, three way cross hybrid, double cross hybrid, synthetic and composite crosses. Heterosis; theories of heterosis, inbreeding depression..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-VNC-201	Unit-IV	Preparation of Bonsai: Conditions required, Rules for Bonsai making: For trunk, For Branches, Plants suitable for Bonsai making, Cultivation, Agrotechniques for Bonsai: Propagation, Season, Potting and repotting, after care, Containers, Planting media..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	Importance of Bonsai: Scientific Benefits, Spiritual Benefits, Ornamental Value, Economic importance, Bonsai skills..	Min 6 Lectures And Remedial & Tutorial Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-CC-206	Based on BOT-CC-201 TO BOT-205	Practical Based on BOT-CC-201 TO BOT-205	Min 6 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion
10	MSc-IV SEM	BOT-CC-401	Unit-II	Classification, structure and functions of: Carbohydrates- Monosaccharides, oligosaccharides, polysaccharides (storage and structural) Amino acids- protein, non- protein, essential and non-essential. Proteins- simple and conjugated Lipids- Fatty acids, simple and compound lipids. Nitrogen and sulfur metabolism: Biological nitrogen fixation, nitrogenase enzyme complex, nodule formation and nod factors. Mechanism of nitrate reduction-nitrate and nitrite reductase. Ammonia assimilation. Assimilation of sulfur...	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-IV	Enzymes: General aspects, characteristics and classification. Factors affecting enzyme activity Active sites and mode of action. Regulation of enzyme activity and allosteric mechanism Enzyme inhibition -reversible and irreversible, competitive and non-competitive. Enzyme kinetics and Michaelis- Menton equation. Signal transduction: Overview, role of membranes, receptors and G-proteins.	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion

				Ca-calmodulin cascade, phospholipid signalling, Cyclic nucleotides- adenylylase. Protein kinases-receptor like protein kinase (RLKs), mitogen activated protein kinase (MAPK), cyclin dependent protein kinase (CDK). Protein phosphatase, Auxin, GA and ABA signal transduction..				
		BOT-CC-401A	Unit-I	<ul style="list-style-type: none"> Gymnosperms in forestry Gymnosperms as a source of wood, resins, tannins, fibers, medicines houseplants, essential oils, fatty oils, decoration and others. 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-II	<ul style="list-style-type: none"> An introduction to plant utilization- Cereals (Wheat, Rice and Maize) and their domestication, Pseudocereals Pulses and their utility, vegetables, fruits (common name, vernacular name and plant parts) and ornamental plants.. 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-EL-402A	Unit-IV	Management of viral diseases: control of vectors, cross protection, pathogen-derived resistance, induced resistance, genetically engineered resistant plants.	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	Management of fungal/bacterial diseases on Rice, Wheat, Potato, Legumes, Mustard.	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		BOT-IRA-401	Unit-IV	<ul style="list-style-type: none"> Soils: Origin and development of soil, soils of India Soil profile Physical, chemical and biological properties of soils Characteristics of problem soils. 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
			Unit-V	<ul style="list-style-type: none"> Conservation of rare and endangered animal species, national parks and wildlife sanctuaries of India. Soil Conservation Water conservation strategies in India Energy conservation and storage. 	Min 8 Lectures	Lectures, PPTs/PDF Notes, ICT Methods & Interactive Sessions	To understand these concepts	Evaluation through Assignments and Discussion
		Practical	Based on BOT-CC-401, BOT-CC-401A,	Practical Based on BOT-CC-401, BOT-CC-401A, BOT-EL-402A & BOT-IRA-401	Min 8 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Group Discussion

			BOT-EL-402A & BOT-IRA-401					
		Master Thesis	BOT-MT-401	Based on BOT-CC-401, BOT-CC-401A, BOT-EL-402A & BOT-IRA-401	Min 8 Lectures	Lab work and Lectures	To understand these concepts	Evaluation through Experiments and Discussion