Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher- Dr. Ritu Hooda
Class–B.Sc. 2nd sem Skill Enhancememt Course
Subject- Floriculture

Weeks	**Syllabus**
Week1	History of gardening; Importance and scope of floriculture and landscape gardening.
Week2	Nursery Management and Routine Garden Operations: Sexual and vegetative methods of propagation
Week3	Soil sterilization; Seed sowing; Pricking; Planting and transplanting; Shading, Stopping or pinching; Defoliation; Wintering; Mulching; Topiary; Role of plant growth regulators.
Week4	Ornamental Plants: Flowering annuals (*Petunia, Chrysanthemum*); perennials (Rose, China Rose); Divine vines (Money plant, Monstera); Shade and ornamental trees; Ornamental bulbous and foliage plants
Week5	Cacti and succulents; Palms and Cycads; Ferns and Selaginellas
Week6	Cultivation of plants in pots; Indoor gardening; Bonsai.
Week7	Principles of Garden Design and landscaping ideas; Features of a garden (Garden wall, Fencing, Steps, Hedge
Week8	Edging, Lawn, Flower beds, Shrubbery, Borders, Water garden.
Week9	Commercial Floriculture: Factors affecting flower production; Production and packaging of cut flowers;
Week 10	Production and packaging of cut flowers; Flower arrangements; Methods to prolong vase life
Week 11	Cultivation of Important cut flowers (Carnation, Aster, Chrysanthemum, Dahlia, Gerbera
Week 12	Gladiolous, Marigold, Rose, Lilium, Orchids)
Week13	Cloning vectors; genomic and cDNA library; transposable elements
Week 14	Aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis;

Week 15	Class Test
Week 16	Revision

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher- Dr. Ritu Hooda
Class–M.Sc. 2nd sem Botany
Subject- Floriculture

Weeks	**Syllabus**
Week1	Essential For Floriculture: History and scope of floriculture
Week2	Layout structure for house and greenhouse plant, cultivation
Week3	Cultivation Of: Dahlia, *Chrysanthemum*, *Gladiolus*, Rose, *Bougainvillea*, Marigold, *Zinnia*, Cacti, Succulents, Orchids, Water plants etc.
Week4	Factors Affecting the Nursery: Light, Temperature, Mineral Nutrient, Fertilizers, Soil, etc.
Week5	Management Of Plants: Plant Care Training, Disease and Pests Control, Soil Mixtures Mycorrhiza and soil fertility Management
Week6	Green House Covering Materials. Types Of Plants: Indoor House Potted Plants, Green House Plants
Week7	Dish Garden, Terrarium, Hanging basket, Field Nursery
Week8	Propagation: Principle and Practice of Clone Selection of conventional micro propagated plants
Week9	Traditional Methods of Propagation: Grafting and Layering.
Week 10	Non-conventional: type of tissue culture system, preparation of media, sterilization, types of media, methods and application,
Week 11	micropropagation and clone selection of important plants.

Week 12	Scope and Importance of Floriculture: Indian Floriculture Industry, Post-Harvest technology of Cut Flowers,
Week13	Cut Flowers industries, Strategies for marketing of floriculture products, IPR, and quarantine rules.
Week 14	Value addition in Floriculture: Cosmetics, perfume industry and outdoor designing.
Week 15	Class Test
Week 16	Revision

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher- Dr. Reena
Class–B.Sc. 3rd Year Medical
Subject- Biochemistry and Plantbiotechnology

Weeks	**Syllabus**
Week1	Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme.
Week2	Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme.
Week3	Basics of Enzymology: coenzyme and co-factors;regulation of enzyme activity; mechanism of action.
Week4	Respiration: ATP – the biological energy currency; aerobic and anaerobic respiration;
Week5	Krebs cycle; electron transport mechanism (chemiosmotic theory); redox -potential;
Week6	Oxidative phosphorylation; pentose phosphate pathway
Week7	Lipid metabolism: Structure and functions of lipids; fatty acid biosynthesis;
Week8	Lipid metabolism: Structure and functions of lipids; fatty acid biosynthesis;

Week9	β-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids.
Week 10	Nitrogen metabolism: Biology of nitrogen fixation;
Week 11	Importance of nitrate reductase and its regulation; ammonium assimilation.
Week 12	Genetic engineering and Biotechnology: Tools and techniques of recombinant DNA technology
Week13	Cloning vectors; genomic and cDNA library; transposable elements
Week 14	Aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis;
Week 15	*Agrobacterium*; vectors for gene delivery and marker genes.
Week 16	Revision

Lesson plan

Session: 2024-25 (Odd Semester)

Name of Teacher- Dr Surender Singh
Class–B.Sc. 3rd Year
Subject- Economic Botany

Weeks	**Syllabus**
Week1	Vavilov's centres of origin of crop plants
Week2	Origin, distribution, botanical description, brief idea of cultivation and economic uses ofof the following: Food plants - cereals (rice, wheat and maize),
Week3	Origin, distribution, botanical description, brief idea of cultivation and economic uses ofof the following: pulses (gram, arhar and Pea)
Week4	Origin, distribution, botanical description, brief idea of cultivation and economic uses ofof the following: vegetables (potato, tomatoand onion).
Week5	Origin, distribution, botanical description, brief idea of cultivation

	and economic uses of the following: Fibers- cotton, jute and flax.
Week6	Origin, distribution, botanical description, brief idea of cultivation and economic uses of the following: Oils- groundnut, mustard
Week7	Origin, distribution, botanical description, brief idea of cultivation and economic uses of the following: , sunflower and coconut.
Week8	Morphological description, brief idea of cultivation and economic uses of the following: Spices- coriander, ferula
Week9	Morphological description, brief idea of cultivation and economic uses of the following: ginger, turmeric, cloves
Week 10	Morphological description, brief idea of cultivation and economic uses of the following: Medicinal plants- *Cinchona, Rauwolfia*
Week 11	Morphological description, brief idea of cultivation and economic uses of the following: Medicinal plants- *Atropa, Opium, Cannabis, Azadirachta, Withania*
Week 12	Botanical description, processing and uses of: Beverages- tea and coffee;
Week13	Botanical description, processing and uses of: Beverages- Rubber - *Hevea*; Sugar- sugarcane
Week 14	General account and sources of timber; energy plantations and bio-fuels.
Week 15	Revision
Week 16	Revision

LESSON PLAN
Session: 2024-25 (Even semester)

Name of teacher- Dr Seema
Class- B. Sc 2
Subject- Plant embryology and taxonomy

CLASS	WEEKS	SYLLABUS
	7-1-2025 to 11-1-2025	Microsporogenesis,tetrad formation
	13-1-2025to 18-1-2025	tapetum types, pollen grain
	20-1-2025 to 25-1-2025	Amoeboid and secretary tapetum
	27-1-2025 to 1-2-2025	Pollination types
	3-2-2025 to 8-2-2025	Special pollination types
	10-2-2025 to 15-2-2025	Megasporogenesis
	17-2-2025 to22-2-2025	Types of embryosac
	24-2-2025 to 1-3-2025	Fertilization and it's types
	3-3-2025 to 8-3-2025	Self incompatibility and it's types
	9-3-2025 to 16-3-2025	Endosperm and types
	17-3-2025 to 22-3-2025	Embryo and types
	24-3-2025 to 29-3-2025	Modern trends in taxonomy
	1-4-2025 to 6-4-2025	Botanical nomenclature and taxonomic keys
	7-4-2025 to 12-4-2025	**Classification of angiosperms and types**
	14-4-2025 to20 -4-2025	**Revision and assignment**
	22-4-2025 to 29-4-2025	Class tests
		MDU examination

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher- DrMonika
Class–Bachleor of Science in Lifescience Section- C
Subject- Diversity of Archigoniates Session w.e.f 01/02/2025
Course Code- 24BOTM401DS01

Weeks	**Syllabus**
Week1	Bryophytes: General characters; adaptations to land habit; classification upto classes (Smith,1935); range of thallus organization
Week2	Alternation of generations; evolution of sporophytes; economic importance
Week3	Morphology, anatomy and reproduction of Marchantia (Hepaticopsida),
Week4	Morphology, anatomy and reproduction of Anthoceros (Anthocerotopsida) and Funaria (Bryopsida)
Week5	Pteridophytes: General characters; classification (upto classes); alternation of generations;
Week6	heterospory and seed habit; apospory and apogamy; stelar evolution; economic importance.
Week7	Morphology, anatomy and reproduction of Rhynia (Psilopsida), Selaginella
Week8	Morphology, anatomy and reproduction of (Lycopsida), Equisetum (Sphenopsida) and Pteris (Pteropsida)
Week9	Palaeobotany: Palaeobotany- Fossils and Fossilization (Process involved, types of fossils
Week 10	importance of fossils; Reconstruction of the fossil plants: Lyginopteris, Williamsonia, Cycadeoidea
Week 11	Bennettites; origin and evolution of Gymnosperms; Geological Time Table scale
Week 12	Gymnosperms: General characters; Pilger and Melchior's (1954) system classification of gymnosperms
Week13	Gymnosperms; Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction
Week 14	life-cycle and economic importance of Cycas, Pinus;
Week 15	life-cycle and economic importance of Ephedra; economic importance

Week 16	Class test ,Assignments
Week 17	Revision and sessional

Lesson plan

Session: 2024-25 (Even Semester Semester)

Name of Teacher- Surender Kumar
Class–M.Sc. 2nd sem
Subject- Plant Biotechnology

Weeks	Syllabus
Week1	Basics of DNA cloning: Enzymes; Cloning vectors (Plasmids, Bacteriophages, Cosmids, Phagemids, Shuttle vectors, transposons vectors, BAC, YAC);
Week2	Principles of restriction digestion and its applications in gene cloning;
Week3	Constriction of genomic library and cDNA library. Gene Amplification: Polymerase Chain Reaction (PCR): Principles, technique and modifications; Gene cloning Vs PCR and Applications of PCR;
Week4	Genetic Engineering: Direct gene transfer methods (particle bombardment, electroporation, PEG mediated, Microinjection),
Week5	Agrobacterium biology and biotechnology, Plant Agrobacterium interaction, Agrobacterium-mediated gene transfer method, Molecular genetics of T-DNA transfer from Agrobacterium to plants,
Week6	Methods for selection and screening of recombinant clones, Markers and Reporter genes, Promoters from heterologous sources and its utility. Comparison of vectormediated and vector free gene transfer.,
Week7	Applications of Recombinant DNA Technology (RDT): Applications of RDT in diagnostic and therapeutic, Uses of transgenes for herbicide, salinity and drought tolerance.

Week8	. Impact and safety, Moral, Social, Regulatory and ethical issues associated with recombinant DNA technology, Chloroplast and Mitochondrial transformation, Gene sequencing.
Week9	Holiday -semester break
Week 10	Introduction of the concept of whole genome sequencing, Principles, and concept of Maxam Gilbert and Sanger sequencing methods, Introduction to next-generation sequencing methodologies.
Week 11	Molecular markers usefulness: Molecular markers for introgression of useful traits in plants, Production of medicinally and agronomically useful recombinant molecules,
Week 12	Nutritional quality improvement - Golden rice and edible vaccine., Revision
Week13	Genomics and Proteomics: Introduction to Genomics and Proteomics, Genome project, Geographical indicators (GI), GATT and TRIPS,
Week 14	Intellectual Property Right and its regulatory requirements: Patents, Trade secrets, Copyright Trademarks
Week 15	Microarray (DNA Chip technology) Intellectual Property Right (IPR):
Week 16	Patenting of biological materials, Plant breeders Rights (PBRs), and Farmer's Rights. Revision

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher- Surender Kumar

Class–M.Sc. 2nd Sem

Subject- Techniques in Plant Sciences

Weeks	Syllabus
Week1	Microscopy: Principles and applications of light, phase contrast, fluorescence microscopes,
Week2	scanning and transmission electron microscopes. Fixation and staining; cytophotometry, flow cytometry, freeze-fracture method, FRAP, FRET,

Week3	Yeast Two-Hybrid Assay, CRISPR/Cas Technique. Chromatography: Principles and applications of gel filtration, ion exchange, affinity, thin layer, gas chromatography, and high-pressure liquid chromatography (HPLC).
Week4	Electrophoresis and centrifugation: Principles and applications of agarose and polyacrylamide gel electrophoresis;
Week5	ultracentrifugation (velocity and buoyant density), Isoelectric focusing. Molecular biology techniques: southern, northern and western blotting techniques,
Week6	polymerase chain reaction (PCR), ELISA,
Week7	ChIP Technique, RIA. Methods for measuring nucleic acid and protein interactions include DNA fingerprinting
Week8	molecular markers (RFLP, AFLP, and RAPD), DNA sequencing, and protein sequencing.
Week9	Holiday- Semester break
Week 10	Spectroscopy: Fluorescence, UV, visible, NMR and ESR spectroscopy;
Week 11	X-ray diffraction. Tracer Biology: Principles and applications of tracer techniques in biology; radioactive isotopes and half-life of isotopes; autoradiography.
Week 12	Revision
Week13	X-ray diffraction and its utility in plant science research. Tracer Biology.
Week 14	Principles and applications of tracer techniques in biology; radioactive isotopes and half-life of isotopes;
Week 15	Autoradiography, uses, limitations and scope.
Week 16	Revision

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher Dr.Pawan Sindhu

Class–B.Sc. 2nd year (4th Sem)

Subject- Biology and Diversity of Seed Plant- II and plant Embryology

Weeks	**Syllabus**
Week1	Brief introduction and Salient features of the system of classification of angiosperms Modern trends in taxonomy Microsporogenesis,tetrad formation

Week2	Classification proposed by Bentham and hooker Botanical nomenclature and taxonomic keys Amoeboid and secretary tapetum
Week3	Classification proposed by Engler & Prantl Pollination types
Week4	Description of an angiospermic plant Megasporogenesis
Week5	Diversity of flowering plants along with their diagnostic features and economic importance of various families
Week6	Family- Ranunculaceae
Week7	Self incompatibility and it's types Family-Brassicaceae
Week8	Endosperm Family- Malvaceae
Week9	Family-Euphorbiaceae
Week 10	Family-Rutaceae Embryo and types
Week 11	Family- leguminosae
Week 12	Family- Apiaceae and Asclepiadaceae
Week13	Family- Lamiaceae and Solanaceae
Week 14	Family- Liliaceae and Poaceae
Week 15	Revision
Week 16	Assignments and class tests

Lesson Plan: Even Semester

Name of Teacher: Dr Anil Dhaka

Class: M. Sc. 1st Year

Paper: Plant Biochemistry & Metabolism

Week 1: Structure of atom, molecules, forces stabilizing macromolecules, weak bonds and covalent bonds, buffers and p*K*a values.

Week 2: General aspects, nature of enzyme catalysis, enzyme kinetics

Week 3: Enzyme regulation and inhibition, isozymes

Week 4: Vitamins and cofactors.

Week 5: Principles of thermodynamics, free energy, chemical and redox, potential, structure

and function of ATP.

Week 6: Nature of light, photoreceptors and photosynthetic pigments, light harvesting complexes Week 7: PSI and PSII, photooxidation of water, photophosphorylation and photoinhibition.

Week 7: RubisCo– structure & function, CO2 assimilation in C3 &C4 plants,

Week 8: CAM pathway, biosynthesis of starch and sucrose, bacterial photosynthesis

Week 9: Structure and classification. Metabolism of carbohydrates: Glycolysis, Pentose

Week 10: Phosphate Pathway, gluconeogenesis, TCA, glyoxylate cycle (C2)

Week 11: Electron transport and oxidative phosphorylation, alternative oxidase. Photorespiration versus dark respiration. Lipids: Composition, structure and classification.

Week12: Biosynthesis and oxidation of structural and storage lipids

Week 13: Composition, classification and structure. Conformation of proteins: Ramachandran plot, secondary, tertiary and quaternary structure, domains, motifs and folds.

Week 14: Amino acid biosynthesis and catabolism. Introduction to Proteomics, protein-protein interactions, and practical applications of proteomics.

Week 15: Nitrogen fixation and N & S metabolism: Overview, biological nitrogen fixation, nodule formation and nod factors

Week 16: Mechanism of nitrate uptake and reduction, ammonium assimilation. Sulfate uptake, transport and assimilation

Lesson Plan: Even Semester

Name of Teacher: Dr Anil Dhaka

Class: M. Sc. 1st Year

Paper: Evolutionary & Economic Botany

Week 1: Origin of life (including aspects of prebiotic environment and molecular

evolution)

Week 2: Concept of evolution; Theories of organic evolution; Mechanisms of speciation. Week 3: Hardy-Weinberg genetic equilibrium, genetic polymorphism and selection

Week 4: Origin, and evolution of economically important crops (Wheat, Rice, and cotton)

Week 5: Origin of agriculture: World centers of primary diversity of domesticated plants; Week 6: Plant introduction;Secondary centers of origin.

Week 7: Plant as a source of renewable energy

Week 8: Innovations for meeting world food demands

Week 9: Botany, cultivation and uses of –cereals, pulses

Week 10: Botany, cultivation and uses of –vegetables and fruits

Week 11: Botany, cultivation and uses of –Fiber-yielding and Medicinal plants

Week 12: Aromatic and Oil yielding plants

Week 13: Important firewood, timber-yielding plants

Week !4: Non-wood forest products (NWFPs) include Bamboo, rattans

Week 15: raw materials for papermaking, gums, tannins, dyes, and resins. Plants used as Week 16 :Avenue trees for shade, pollution control and aesthetics

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher Dr.Ritu Nandal
Class–M.Sc. Botany
Subject- Taxonomy of Angiosperms
Course Code-24BOT202DS02

Weeks	Syllabus
Week1	Origin and evolution of angiosperms; general principles of angiosperm phylogeny, evolutionary trends in angiosperms
Week2	Ecads and ecotypes; speciation; various species concepts, adaptive radiation
Week3	adaptive modifications; concept of taxonomic characters; character weighting; taxonomic hierarchy and different taxonomic categories
Week4	Principles of taxonomy, characters considered before plant identification; identification keys,

Week5	computer aided identification, floral formula and floral diagram. Salient features of the ICBN
Week6	some important rules of nomenclature; brief idea about phylocode as a new system of nomenclature
Week7	Systems of angiosperm classification: Phenetic versus phylogenetic systems; cladistics in taxonomy
Week8	Relative merits and demerits of major classification systems. Taxonomic evidence Morphology, anatomy, palynology, embryology, cytology
Week9	Modern trends in plant taxonomy: Numerical taxonomy, Chemotaxonomy, molecular taxonomy.
Week 10	Herbarium and botanical garden: purpose of modern herbarium
Week 11	techniques of herbarium preparation
Week 12	description of flowering plants in different types of herbaria
Week13	major Indian herbaria and botanical gardens
Week 14	importance of herbarium and botanical gardens in botanical research;
Week 15	Relevance of taxonomy to conservation, sustainable utilization of bio-resources and ecosystem research.
Week 16	Revision, Assignments and class tests
Week 17	Sessional Exam

Lesson plan

Session: 2024-25 (Even Semester)

Name of Teacher Dr.Ritu Nandal
Class–B.Sc. 2nd year (4th Sem)
Subject- Biology and Diversity of Seed Plant- II

Weeks	**Syllabus**
Week1	Brief introduction and Salient features of the system of classification of angiosperms
Week2	Classification proposed by Bentham and hooker
Week3	Classification proposed by Engler & Prantl
Week4	Description of an angiospermic plant
Week5	Diversity of flowering plants along with their diagnostic features and economic importance of various families

Week6	Family- Ranunculaceae
Week7	Family-Brassicaceae
Week8	Family- Malvaceae
Week9	Family-Euphorbiaceae
Week 10	Family-Rutaceae
Week 11	Family- leguminosae
Week 12	Family- Apiaceae and Asclepiadaceae
Week13	Family- Lamiaceae and Solanaceae
Week 14	Family- Liliaceae and Poaceae
Week 15	Revision
Week 16	Assignments and class tests

Lesson plan
Session: 2024-25 (Even Semester)

Name of Teacher- Dr.Naveeta
Class–Bachleor of Science in Lifescience Section- A&B
Subject- Diversity of Archigoniates Session w.e.f 01/02/2025
Course Code- 24BOTM401DS01

Weeks	**Syllabus**
Week1	Bryophytes: General characters; adaptations to land habit; classification upto classes (Smith,1935); range of thallus organization
Week2	Alternation of generations; evolution of sporophytes; economic importance
Week3	Morphology, anatomy and reproduction of Marchantia (Hepaticopsida),
Week4	Morphology, anatomy and reproduction of Anthoceros (Anthocerotopsida) and Funaria (Bryopsida)
Week5	Pteridophytes: General characters; classification (upto classes); alternation of generations;
Week6	heterospory and seed habit; apospory and apogamy; stelar evolution; economic importance.
Week7	Morphology, anatomy and reproduction of Rhynia (Psilopsida), Selaginella

Week8	Morphology, anatomy and reproduction of (Lycopsida), Equisetum (Sphenopsida) and Pteris (Pteropsida)
Week9	Palaeobotany: Palaeobotany- Fossils and Fossilization (Process involved, types of fossils
Week 10	importance of fossils; Reconstruction of the fossil plants: Lyginopteris, Williamsonia, Cycadeoidea
Week 11	Bennettites; origin and evolution of Gymnosperms; Geological Time Table scale
Week 12	Gymnosperms: General characters; Pilger and Melchior's (1954) system classification of gymnosperms
Week13	Gymnosperms; Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction
Week 14	life-cycle and economic importance of Cycas, Pinus;
Week 15	life-cycle and economic importance of Ephedra; economic importance
Week 16	Class test ,Assignments
Week 17	Revision and sessional