

Govt. General Degree College, Mohanpur

Dept. of Botany

Lesson Plan

SEM 1

DSC-1A(CC-1) : Biodiversity (Microbes, Algae, Fungi and Archegoniate)

Credits 06

DSC1AT(C1T) : Biodiversity (Microbes, Algae, Fungi and Archegoniate)

Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Microbes	Viruses – Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance.	DS	3
	Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.	RPD	4
Unit 2: Algae	General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: <i>Nostoc</i> , <i>Chlamydomonas</i> , <i>Oedogonium</i> , <i>Vaucheria</i> , <i>Fucus</i> , <i>Polysiphonia</i> . Economic importance of algae.	RPD	9
Unit 3: Fungi	Introduction - General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of <i>Rhizopus</i> (Zygomycota) <i>Penicillium</i> , <i>Alternaria</i> (Ascomycota), <i>Puccinia</i> , <i>Agaricus</i> (Basidiomycota); Symbiotic Associations- Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance.	RPD	9
Unit 4: Introduction to	Unifying features of archegoniate, Transition to land habit, Alternation of generations.	DS	1

Unit	Topic	Teacher	No. of classes
Archegoniate			
Unit 5: Bryophytes	General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of <i>Marchantia</i> and <i>Funaria</i> . (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of <i>Sphagnum</i> .	DS	4
Unit 6: Pteridophytes	General characteristics, classification, Early land plants (<i>Cooksonia</i> and <i>Rhynia</i>). Classification (up to family), morphology, anatomy and reproduction of <i>Selaginella</i> , <i>Equisetum</i> and <i>Pteris</i> . (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes.	DS	3
Unit 4: Gymnosperms	General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of <i>Cycas</i> and <i>Pinus</i> . (Developmental details not to be included).	DS	3

DSC1P(C1P) : Biodiversity (Microbes, Algae, Fungi and Archegoniate(Practical))

List of Practical Credits : 02

Unit	Topic	Teacher	No. of classes
1	EMs/Models of viruses – T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle.	RPD	2
2	Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule. Gram staining.	RPD	2
3	Study of vegetative and reproductive structures of <i>Nostoc</i> , <i>Chlamydomonas</i> (electron micrographs), <i>Oedogonium</i> , <i>Vaucheria</i> , <i>Fucus</i> * and <i>Polysiphonia</i> through temporary preparations and permanent slides. (* <i>Fucus</i> - Specimen and permanent slides).	RPD	4
4	<i>Rhizopus</i> and <i>Penicillium</i> : Asexual stage from temporary mounts and sexual structures through permanent slides.	RPD	2

Unit	Topic	Teacher	No. of classes
5	<i>Alternaria</i> : Specimens/photographs and tease mounts.	RPD	1
6	<i>Puccinia</i> : Herbarium specimens of Black Stem Rust of Wheat and infected Barberry leaves; section/tease mounts of spores on Wheat and permanent slides of both the hosts.	RPD	1
7	<i>Agaricus</i> : Specimens of button stage and full grown mushroom; Sectioning of gills of <i>Agaricus</i> .	RPD	1
8	Lichens: Study of growth forms of lichens (crustose, foliose and fruticose).	RPD	1
9	Mycorrhiza: ecto mycorrhiza and endo mycorrhiza (Photographs).	RPD	1
10	<i>Marchantia</i> - morphology of thallus, w.m. rhizoids and scales, v.s. thallus through gemma cup, w.m. gemmae (all temporary slides), v.s. antheridiophore, archegoniophore, l.s. sporophyte (all permanent slides).	DS	1
11	<i>Funaria</i> - morphology, w.m. leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); permanent slides showing antheridial and archegonial heads, l.s. capsule and protonema.	DS	1
12	<i>Selaginella</i> - morphology, w.m. leaf with ligule, t.s. stem, w.m. strobilus, w.m. microsporophyll and megasporophyll (temporary slides), l.s. strobilus (permanent slide).	DS	1
13	<i>Equisetum</i> - morphology, t.s. internode, l.s. strobilus, t.s. strobilus, w.m. sporangiophore, w.m. spores (wet and dry)(temporary slides); t.s. rhizome (permanent slide).	DS	1
14	<i>Pteris</i> - morphology, t.s. rachis, v.s. sporophyll, w.m. sporangium, w.m. spores (temporary slides), t.s. rhizome, w.m. prothallus with sex organs and young sporophyte (permanent slide).	DS	1
15	<i>Cycas</i> - morphology (coralloid roots, bulbil, leaf), t.s. coralloid root, t.s. rachis, v.s. leaflet, v.s. microsporophyll, w.m. spores (temporary slides), l.s. ovule, t.s. root (permanent slide).	DS	1
16	<i>Pinus</i> - morphology (long and dwarf shoots, w.m. dwarf shoot, male and female), w.m. dwarf shoot, t.s. needle, t.s. stem, , l.s./t.s. male cone, w.m. microsporophyll, w.m. microspores (temporary slides), l.s. female cone, t.l.s. & r.l.s. stem	DS	1

Unit	Topic	Teacher	No. of classes
	(permanent slide).		

SEM 2

DSC-1B(CC-2): Plant Ecology and Taxonomy Credits 06

DSC1B(C2T): Plant Ecology and Taxonomy Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Introduction		DS	1
Unit 2: Ecological factors	Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes.	DS	6
Unit 3: Plant communities	Characters; Ecotone and edge effect; Succession; Processes and types.	DS	2
Unit 4: Ecosystem	Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous	DS	3
Unit 5: Phytogeography	Principle biogeographical zones; Endemism	DS	1
Unit 6 Introduction to plant taxonomy	Identification, Classification, Nomenclature.	RPD	1
Unit 7: Identification	Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	RPD	3
Unit 8:	Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.	RPD	4

Unit	Topic	Teacher	No. of classes
Unit 9: Taxonomic hierarchy	Ranks, categories and taxonomic groups.	RPD	1
Unit 10: Botanical nomenclature	Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations.	RPD	5
Unit 11: Classification	Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series).	RPD	4
Unit 12: Biometrics, numerical taxonomy and cladistics	Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).	RPD	2

DSC1BP(C2P): Plant Ecology and Taxonomy(Practical) Credits 02

Practical:

Unit	Topic	Teacher	No. of classes
1	Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter.	DS	2
2	Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test.	DS	3
3	Comparison of bulk density, porosity and rate of infiltration of water in soil of three habitats. a. Study of morphological adaptations of hydrophytes and xerophytes (four each). b. Study of biotic interactions of the following: Stem parasite (<i>Cuscuta</i>), Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)	DS	8
4	Determination of minimal quadrat size for the study of herbaceous vegetation in the college	RPD	5

Unit	Topic	Teacher	No. of classes
	campus by species area curve method. (species to be listed)		
5	Quantitative analysis of herbaceous vegetation in the college campus for frequency and comparison with Raunkiaer's frequency distribution law	RPD	5
6	Study of vegetative and floral characters of the following families (Description, V.S. flower, section of ovary, floral diagram/s, floral formula/e and systematic position according to Bentham & Hooker's system of classification): Brassicaceae - <i>Brassica</i> , <i>Alyssum</i> / <i>Iberis</i> ; Asteraceae - <i>Sonchus/Launaea</i> , <i>Vernonia/Ageratum</i> , <i>Eclipta/Tridax</i> ; Solanaceae - <i>Solanum nigrum</i> , <i>Withania</i> ; Lamiaceae - <i>Salvia</i> , <i>Ocimum</i> ; Liliaceae - <i>Asphodelus</i> / <i>Lilium</i> / <i>Allium</i> .	RPD	8
7	Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book).	RPD	2

SEM 3

DSC-1C(CC-3) : Plant Anatomy and Embryology Credits 06

DSC 1CT(C3T) : Plant Anatomy and Embryology Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Meristematic and permanent tissues	Root and shoot apical meristems; Simple and complex tissues.	DS	4
Unit 2: Organs	Structure of dicot and monocot root stem and leaf.	DS	3
Unit 3: Secondary Growth	Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood (heartwood and sapwood).	DS	2
Unit 4: Adaptive and protective systems	Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes.	DS	3

Unit	Topic	Teacher	No. of classes
Unit 5: Structural organization of flower	Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.	RPD	2
Unit 6: Pollination and fertilization	Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms.	RPD	3
Unit 7: Embryo and endosperm	Endosperm types, structure and functions; Dicot and monocot embryo; Embryo endosperm relationship.	RPD	2
Unit 8: Apomixis and polyembryony	Definition, types and practical applications.	RPD	1

DSC1CP(C3P) : Plant Anatomy and Embryology(Practical) Credits 02
Practical

Unit	Topic	Teacher	No. of classes
1	Study of meristems through permanent slides and photographs.	DS	1
2	Tissues (parenchyma, collenchyma and sclerenchyma); Macerated xylary elements, Phloem (Permanent slides, photographs)	DS	1
3	Stem: Monocot: <i>Zea mays</i> ; Dicot: <i>Helianthus</i> ; Secondary: <i>Helianthus</i> (only Permanent slides).	DS	2
4	Root: Monocot: <i>Zea mays</i> ; Dicot: <i>Helianthus</i> ; Secondary: <i>Helianthus</i> (only Permanent slides).	DS	2
5	Leaf: Dicot and Monocot leaf (only Permanent slides).	DS	1
6	Adaptive anatomy: Xerophyte (<i>Nerium</i> leaf); Hydrophyte (<i>Hydrilla</i> stem).	DS	2
7	Structure of anther (young and mature), tapetum (amoeboid and secretory) (Permanent slides).	RPD	1
8	Types of ovules: anatropous, orthotropous, circinotropous, amphitropous/ campylotropous.	RPD	1
9	Female gametophyte: <i>Polygonum</i> (monosporic)	RPD	1

Unit	Topic	Teacher	No. of classes
	type of Embryo sac Development (Permanent slides/photographs).		
10	Ultrastructure of mature egg apparatus cells through electron micrographs.	RPD	1
11	Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens).	RPD	3
12	Dissection of embryo/endosperm from developing seeds.	RPD	1
13	Calculation of percentage of germinated pollen in a given medium.	RPD	1

SEC-1: Bio-fertilizers Credits 02

SEC1T: Bio-fertilizers

Unit	Topic	Teacher	No. of classes
Unit 1	General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis.	RPD	2
Unit 2	<i>Azospirillum</i> : isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms. <i>Azotobacter</i> : classification, characteristics – crop response to <i>Azotobacter</i> inoculum, maintenance and mass multiplication.	RPD	2
Unit 3	Cyanobacteria (blue green algae), <i>Azolla</i> and <i>Anabaena azollae</i> association, nitrogen fixation, factors affecting growth, blue green algae and <i>Azolla</i> in rice cultivation.	RPD	2
Unit 4	Mycorrhizal association, types of mycorrhizal association, taxonomy, occurrence and distribution, phosphorus nutrition, growth and yield – colonization of VAM – isolation and inoculum production of VAM, and its influence on growth and yield of crop plants.	DS	2
Unit 5	Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of	DS	2

Unit	Topic	Teacher	No. of classes
	vermicomposting – field Application.		

SEM 4

DSC-1D(CC-4): Plant Physiology and Metabolism Credits 06

DSC1DT(C4T): Plant Physiology and Metabolism Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Plant-water relations	Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation.	DS	2
Unit 2: Mineral nutrition	Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.	DS	3
Unit 3: Translocation in phloem	Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading.	DS	1
Unit 4: Photosynthesis	Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation; Photorespiration.	RPD	7
Unit 5: Respiration	Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.	RPD	5
Unit 6: Enzymes	Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.	RPD	2
Unit 7: Nitrogen metabolism	Biological nitrogen fixation; Nitrate and ammonia assimilation.	RPD	1
Unit 8: Plant	Discovery and physiological roles of auxins,	DS	5

Unit	Topic	Teacher	No. of classes
growth regulators	gibberellins, cytokinins, ABA, ethylene.		
Unit 9: Plant response to light and temperature	Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far red light responses on photomorphogenesis; Vernalization.	DS	3

DSC1DP(C4P): Plant Physiology and Metabolism (Practical) Credits 02
Practical

Unit	Topic	Teacher	No. of classes
1	Determination of osmotic potential of plant cell sap by plasmolytic method.	DS	1
2	To study the effect of two environmental factors (light and wind) on transpiration by excised twig.	DS	2
3	Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte.	DS	2
4	Demonstration of Hill reaction.	RPD	1
5	Demonstrate the activity of catalase and study the effect of pH and enzyme concentration.	RPD	2
6	To study the effect of light intensity and bicarbonate concentration on O ₂ evolution in photosynthesis.	RPD	2
7	Comparison of the rate of respiration in any two parts of a plant.	RPD	1
8	Separation of amino acids by paper chromatography.	DS	1

Demonstration experiments (any four)

Unit	Topic	Teacher	No. of classes
1	Bolting.	DS	1
2	Effect of auxins on rooting.	DS	1
3	Suction due to transpiration.	DS	1
4	R.Q.	RPD	1
5	Respiration in roots.	RPD	1

SEC-2: Herbal Technology Credits 02
SEC2T: Herbal Technology

Unit	Topic	Teacher	No. of classes
Unit-1	Herbal medicines: history and scope - definition of medical terms - role of medicinal plants in Siddha systems of medicine; cultivation - harvesting - processing - storage - marketing and utilization of medicinal plants.	DS	2
Unit-2	Pharmacognosy - systematic position m edicinal uses of the following herbs in curing various ailments; Tulsi, Ginger, Fenugreek, Indian Goose berry and Ashoka.	DS	2
Unit-3	Phytochemistry - active principles and methods of their testing - identification andutilization of the medicinal herbs; <i>Catharanthus roseus</i> (cardiotonic), <i>Withania somnifera</i> (drugs acting on nervous system), <i>Clerodendron phlomoides</i> (anti-rheumatic) and <i>Centella asiatica</i> (memory booster).	DS	2
Unit-4	Analytical pharmacognosy: Drug adulteration - types, methods of drug evaluation -Biological testing of herbal drugs - Phytochemical screening tests for secondary metabolites (alkaloids, flavonoids, steroids, triterpenoids, phenolic compounds).	RPD	2
Unit-5	Medicinal plant banks micro propagation of important species (<i>Withania somnifera</i> , neem and tulsi- Herbal foods-future of pharmacognosy).	RPD	2

SEM 5

DSE-1 : Economic Botany and Biotechnology Credits 06
DSE1T : Economic Botany and Biotechnology Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Origin of Cultivated Plants	Concept of centres of origin, their importance with reference to Vavilov's work.	DS	1
Unit 2: Cereals	Wheat -Origin, morphology, uses.	DS	1
Unit 3: Legumes	General account with special reference to Gram and soybean.	DS	1

Unit	Topic	Teacher	No. of classes
Unit 4: Spices	General account with special reference to clove and black pepper (Botanical name, family, part used, morphology and uses).	DS	1
Unit 5: Beverages	Tea (morphology, processing, uses).	RPD	1
Unit 6: Oils and Fats	General description with special reference to groundnut.	DS	1
Unit 7: Fibre Yielding Plants	General description with special reference to Cotton (Botanical name, family, part used, morphology and uses).	RPD	1
Unit 8: Introduction to biotechnology		DS	1
Unit 9: Plant tissue culture	Micropropagation ; haploid production through androgenesis and gynogenesis; brief account of embryo & endosperm culture with their applications.	DS	3
Unit 10: Recombinant DNA Techniques	Blotting techniques: Northern, Southern and Western Blotting, DNA Fingerprinting; Molecular DNA markers i.e. RAPD, RFLP, SNPs; DNA sequencing, PCR and Reverse Transcriptase-PCR. Hybridoma and monoclonal antibodies, ELISA and Immunodetection. Molecular diagnosis of human disease, Human gene Therapy.	RPD	10

**DSE1P : Economic Botany and Biotechnology(Practical) Credits 02
Practical**

Unit	Topic	Teacher	No. of classes
1	Study of economically important plants : Wheat, Gram, Soybean, Black pepper, Clove Tea, Cotton, Groundnut through specimens, sections and microchemical tests	DS	3
2	Familiarization with basic equipments in tissue culture.	DS	1
3	Study through photographs: Anther culture, somatic embryogenesis, endosperm and embryo culture; micropropagation.	DS	2

Unit	Topic	Teacher	No. of classes
4	Study of molecular techniques: PCR, Blotting techniques, AGE and PAGE.	RPD	2

SEC-3: Ethnobotany Credits 02

SEC3T: Ethnobotany

Unit	Topic	Teacher	No. of classes
Unit-1: Ethnobotany	Introduction, concept, scope and objectives; Ethnobotany as an interdisciplinary science. The relevance of ethnobotany in the present context; Major and minor ethnic groups or Tribals of India, and their life styles. Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses.	RPD	2
Unit-2: Methodology of Ethnobotanical studies	a) Field work b) Herbarium c) Ancient Literature d) Archaeological findings e) temples and sacred places.	RPD	2
Unit-3: Role of ethnobotany in modern Medicine	Medico-ethnobotanical sources in India; Significance of the following plants in ethno botanical practices (along with their habitat and morphology) a) <i>Azadiractha indica</i> b) <i>Ocimum sanctum</i> c) <i>Vitex negundo</i> . d) <i>Gloriosa superba</i> e) <i>Tribulus terrestris</i> f) <i>Pongamia pinnata</i> g) <i>Cassia auriculata</i> h) <i>Indigofera tinctoria</i> . Role of ethnobotany in modern medicine with special example <i>Rauwolfia serpentina</i> , <i>Trichopus zeylanicus</i> , <i>Artemisia</i> , <i>Withania</i> . Role of ethnic groups in conservation of plant genetic resources. Endangered taxa and forest management (participatory forest management).	DS	3
Unit-4: Ethnobotany and legal aspects	Ethnobotany as a tool to protect interests of ethnic groups. Sharing of wealth concept with few examples from India. Biopiracy, Intellectual Property Rights and Traditional Knowledge.	DS	2

SEM 6

DSE-2: Genetics and Plant Breeding Credits 06

DSE2T: Genetics and Plant Breeding Credits 04

Unit	Topic	Teacher	No. of classes
Unit 1: Heredity	1. Brief life history of Mendel	RPD	8

Unit	Topic	Teacher	No. of classes
	2. Terminologies 3. Laws of Inheritance 4. Modified Mendelian Ratios: 2:1- lethal Genes; 1:2:1- Co - dominance, incomplete dominance;- 9:7; 9:4:3; 13:3; 12:3:1. 5. Chi Square 6. Pedigree Analysis 7. Cytoplasmic Inheritance: Shell Coiling in Snail, Kappa particles in Paramecium, leaf variegation in <i>Mirabilis jalapa</i> , Male sterility. 8. Multiple allelism 9. Pleiotropism 10. Chromosome theory of Inheritance.		
Unit 2: Sex-determination and Sex-linked Inheritance		RPD	1
Unit 3: Linkage and Crossing over	Linkage: concept & history, complete & incomplete linkage, bridges experiment, coupling & repulsion, recombination frequency, linkage maps based on two and three factor crosses. Crossing over: concept and significance, cytological proof of crossing over.	RPD	2
Unit 4: Mutations and Chromosomal Aberrations	Types of mutations, effects of physical & chemical mutagens. Numerical chromosomal changes: Euploidy, Polyploidy and Aneuploidy ; Structural chromosomal changes: Deletions, Duplications, Inversions & Translocations.	RPD	3
Unit 5: Plant Breeding	Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding.	DS	1
Unit 6: Methods of crop improvement	Introduction: Centres of origin and domestication of crop plants, plant genetic resources; Acclimatization; Selection methods: For self pollinated, cross pollinated and vegetatively propagated plants; Hybridization: For self, cross and vegetatively propagated plants –Procedure, advantages and limitations.	DS	4
Unit 7: Quantitative inheritance	Concept, mechanism, examples. Monogenic vs polygenic Inheritance.	DS	1
Unit 8: Inbreeding depression and heterosis	History, genetic basis of inbreeding depression and heterosis; Applications.	DS	1

Unit	Topic	Teacher	No. of classes
Unit 9: Crop improvement and breeding	Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.	DS	1

**DSE2P: Genetics and Plant Breeding(Practical) Credits 02
Practical**

Unit	Topic	Teacher	No. of classes
1	Mendel's laws through seed ratios. Laboratory exercises in probability and chisquare.	RPD	1
2	Chromosome mapping using point test cross data.	RPD	1
3	Pedigree analysis for dominant and recessive autosomal and sex linked traits.	RPD	1
4	Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4).	RPD	2
5	Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes through photographs.	DS	1
6	Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge.	DS	1
7	Hybridization techniques - Emasculation, Bagging (For demonstration only).	DS	1
8	Induction of polyploidy conditions in plants (For demonstration only).	DS	1

**SEC-4: Plant Diversity and Human Welfare Credits 02
SEC4T: Plant Diversity and Human Welfare**

Unit	Topic	Teacher	No. of classes
Unit-1: Plant diversity and its scope	Genetic diversity, Species diversity, Plant diversity at the ecosystem level, Agro biodiversity and cultivated plant taxa, wild taxa. Values and uses of Biodiversity: Ethical and aesthetic values, Precautionary principle, Methodologies for valuation, Uses of plants, Uses of microbes.	DS	2
Unit-2: Loss of Biodiversity	Loss of genetic diversity, Loss of species diversity, Loss of ecosystem diversity, Loss of agro-biodiversity, Projected scenario for	DS	2

Unit	Topic	Teacher	No. of classes
	biodiversity loss, Management of Plant Biodiversity: Organizations associated with biodiversity management- Methodology for execution-IUCN, UNEP, UNESCO, WWF, NBPGR; Biodiversity legislation and conservations, Biodiversity information management and communication.		
Unit-3: Conservation of Biodiversity	Conservation of genetic diversity, species diversity and ecosystem diversity, <i>In situ</i> and <i>ex situ</i> conservation, Social approaches to conservation, Biodiversity awareness programmes, Sustainable development.	RPD	2
Unit-4: Role of plants in relation to Human Welfare	a) Importance of forestry their utilization and commercial aspects b) Avenue trees, c) Ornamental plants of India. d) Alcoholic beverages through ages. Fruits and nuts: Important fruit crops their commercial importance. Wood and its uses.	RPD	2

Govt. General Degree College, Mohanpur

Dept. of Botany

Lesson Plan (1+1+1)

PART I

Paper - I (Theoretical) Full Marks - 100

Section - I

Bacteria, Viruses, Algae, Fungi and Plant Pathology – 30 Lectures

Sl. No.	Topic	Teacher	No. of classes
1	Bacteria	RPD	5
2	Viruses	RPD	4
3	Algae	RPD	8
4	Fungi	RPD	8
5	Plant Pathology	RPD	5

Section – II

Bryophyte, Pteridophyte, Gymnosperm and Paleobotany – 30 Lectures

Sl. No.	Topic	Teacher	No. of classes
1	Bryophyte	DS	8
2	Pteridophyte	DS	8
3	Gymnosperm	DS	8
4	Paleobotany	DS	6

Section – III

Morphology and Embryology, Taxonomy of Angiosperms, Economic Botany – 40 Lectures

Sl. No.	Topic	Teacher	No. of classes
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Sl. No.	Topic	Teacher	No. of classes
1	Morphology and Embryology	RPD	12
2	Taxonomy of Angiosperms	RPD	15
3	Economic Botany	DS	13

Part – II

Paper – II (Theoretical)

Full Marks – 100

Section – I

Anatomy, Ecology, Ethnobotany – 35 Lectures

Sl. No.	Topic	Teacher	No. of classes
1	Anatomy	DS	15
2	Ecology	RPD	15
3	Ethnobotany	RPD	5

Section – II

Cell Biology, Genetics – 35 Lectures

Sl. No.	Topic	Teacher	No. of classes
1	Cell Biology	DS	17
2	Genetics	RPD	18

Section – III

Plant Physiology and Biochemistry – 30 Lectures

Sl. No.	Topic	Teacher	No. of classes
1	Plant Physiology: Water relation, Transpiration, Mineral Nutrition	DS	6
	Plant Physiology: Enzyme, Photosynthesis, Respiration, Nitrogen Metabolism	RPD	10
	Plant Physiology: Hormones, Photoperiodism	DS	8

Sl. No.	Topic	Teacher	No. of classes
2	Biochemistry	RPD	6

**PAPER - III (PRACTICAL)
DISTRIBUTION OF MARKS**

Full Marks - 100, Time: 6 (six) hours.

1. Work out: Algae/ Fungi (anyone) 10
2. Work out: Bryophytes/ Pteridophytes (any one) 10
3. Angiospermic plant 15
4. Plant Physiology Experiment 12
5. Anatomy 10
6. Mitosis Squash Preparation 07
7. Identification 18

Cryptogams-2, Gymnosperm-I, Morphology-I, Cytology-I,
Anatomy1, Angiosperm spotting-3 (species and family).

8. Submission 11

Laboratory note books-4, Slides-2, Herbarium Specimens-3, Field
Note Book-2

9. Viva-voce 07

Sl. No.	Topic	Teacher	No. of classes
1	Algae, Fungi	RPD	3
2	Bryophytes, Pteridophytes	DS	3
3	Angiospermic plant	DS	3
4	Plant Propagation	RPD	3

Part - III

Paper IV A (Theoretical), Full Marks - 75

Section - I

Genetics, Plant Breeding and Biometry - 20 Lectures.

Sl. No.	Topic	Teacher	No. of classes
1	Genetics	RPD	8
2	Plant Breeding	DS	7
3	Biometry	RPD	5

Section - II

Medicinal Plants, Floriculture, Plant protection, Plant propagation - 12 Lectures.

Sl. No.	Topic	Teacher	No. of classes
1	Medicinal Plants	RPD	3
2	Floriculture	DS	3
3	Plant Protection	DS	3
4	Plant Propagation	RPD	3

Section-III

Mushroom culture, Biofertilizer - 06 Lectures.

Sl. No.	Topic	Teacher	No. of classes
1	Mushroom Culture	RPD	3
2	Biofertilizer	DS	3

Section - IV

Seed preservation, Biodiversity - 06 Lectures.

Sl. No.	Topic	Teacher	No. of classes
1	Seed Preservation	DS	3
2	Biodiversity	RPD	3

Paper IV B (Practical)

Full Marks – 25

DISTRIBUTION OF MARKS

1. Microbiology (staining-2, drawing-I, identification of morphological types only-2) = 05 marks.
2. Biometry (calculation-2, comment-2) = 04 marks.
3. Seed viability test (result-2, comment-2) = 04 marks.
4. Identification of Medicinal plants (1 x 4) = 04 marks.
5. Practical Note Book = 03 marks.
6. Viva-voce = 05 marks.

Sl. No.	Topic	Teacher	No. of classes
1	Microbiology	DS	3
2	Biometry	RPD	3
3	Seed viability test	DS	2
4	Identification of Medicinal plants	RPD	2