EGRA SARADA SHASHI BHUSAN COLLEGE
DEPARTMENT OF BOTANY
PURBA MEDINIPUR,721429

COURSE DIVISION CBCS GENERAL

ACADEMIC SESSION-2018-2019

SEM-I

PAPER	TEACHER	DETAILED SYLLABUS
DSC1AT	PROF.SHAMBHU RANA(S.R)	**DSC1AT(C1T) : Biodiversity** **Credits 04** Viruses – Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.
	PROF.RACHANA BERA(R.B)	**Unit 2: Algae** General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: *Nostoc*, *Chlamydomonas, Oedogonium*, *Vaucheria, Fucus, Polysiphonia*. Economic importance of algae
	PROF.BISWAJIT PRADHAN(B.P)	**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 *Rhizopus* (Zygomycota) *Penicillium, Alternaria* (Ascomycota), *Puccinia, Agaricus* (Basidiomycota); Symbiotic Associations-Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance

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DSC1AT	PROF.SHAMBHU RANA(S.R)	**Unit 4: Introduction to Archegoniate** Unifying features of archegoniates, Transition to land habit, Alternation of generations. **U nit 5: Bryophytes** General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of *Marchantia* and *Funaria*. (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of *Sphagnum*.
	PROF.SASWATI ROY(S.ROY)	**Unit 6: Pteridophytes** General characteristics, classification, Early land plants (*Cooksonia* and *Rhynia*). Classification (up to family), morphology, anatomy and reproduction of *Selaginella*, *Equisetum* and *Pteris*. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes. **U nit 4: Gymnosperms** General characteristics, classification. Classification (up to family), morphology, anatomy and reproduction of *Cycas* and *Pinus*. (Developmental details not to be included). Ecological and economical importance.
DSC1P(C1P)	PROF.BISWAJIT PRADHAN(B.P)	**DSC1P(C1P) : Biodiversity Credit-02** **List of Practical Credits : 02** 1. EMs/Models of viruses – T-Phage and TMV, Line drawing/Photograph of Lytic and Lysogenic Cycle. 2. Types of Bacteria from temporary/permanent slides/photographs; EM bacterium; Binary Fission; Conjugation; Structure of root nodule.Gram staining 3. Study of vegetative and reproductive structures of *Nostoc, Chlamydomonas* (electron micrographs), *Oedogonium, Vaucheria, Fucus* and Polysiphonia* through temporary preparations and permanent slides. (* *Fucus* - Specimen and permanent slides) 4. *Rhizopus and Penicillium*: Asexual stage from temporary mounts and sexual structures through permanent slides. 5. *Alternaria:* Specimens/photographs and tease mounts. 6. *Puccinia*: 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. 7. *Agaricus*: Specimens of button stage and full grown mushroom; Sectioning of gills of *Agaricus*. 8. Lichens: Study of growth forms of lichens (crustose, foliose and fruticose) 9. Mycorrhiza: ecto mycorrhiza and endo mycorrhiza (Photographs)

SEM-I		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC1P(C1P)	PROF.BISWAJIT PRADHAN(B.P)	10. *Marchantia*- 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). 11. *Funaria*- morphology, w.m. leaf, rhizoids, operculum, peristome, annulus, spores (temporary slides); permanent slides showing antheridial and archegonial heads, l.s. capsule and protonema.
	PROF.SASWATI ROY(S.ROY)	12. *Selaginella* - morphology, w.m. leaf with ligule, t.s. stem, w.m. strobilus, w.m. microsporophyll and megasporophyll (temporary slides), l.s. strobilus (permanent slide). 13. *Equisetum* - 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). 14. *Pteris* - 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). 15. *Cycas* - 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). 16. *Pinus* - 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 (permanent slide).

SEM-II		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC1B(C2T)	PROF.SASWATI ROY(S.ROY)	**DSC1B(C2T): Plant Ecology and Taxonomy Credits 04** **Unit 1: Introduction** **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. **U nit 3: Plant communities** Characters; Ecotone and edge effect; Succession; Processes and types. **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 **Unit 5: Phytogeography** Principle biogeographical zones; Endemism
	PROF.SHAMBHU RANA(S.R)	**U nit 6 Introduction to plant taxonomy** Identification, Classification, Nomenclature. **Unit 7: Identification** Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access **Unit 8:Taxonomic evidences from palynology, cytology, phytochemistry and molecular data**. **Unit 9: Taxonomic hierarchy** Ranks, categories and taxonomic groups **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. **U nit 11: Classification** Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series). **Unit 12: Biometrics, numerical taxonomy and cladistics** Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).

SEM-II		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC1BP(C2P)	PROF.SASWATI ROY(S.ROY)	**DSC1BP(C2P): Plant Ecology and Taxonomy(Practical) Credits 02** **Practical:** 1. Study of instruments used to measure microclimatic variables: Soil thermometer, maximum and minimum thermometer, anemometer, psychrometer/hygrometer, rain gauge and lux meter. 2. Determination of pH, and analysis of two soil samples for carbonates, chlorides, nitrates, sulphates, organic matter and base deficiency by rapid field test. 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 (*Cuscuta)*, Root parasite (Orobanche), Epiphytes, Predation (Insectivorous plants)
	PROF.SHAMBHU RANA(S.R)	4. Determination of minimal quadrat size for the study of herbaceous vegetation in the college 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 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 -*Brassica, Alyssum / Iberis;* Asteraceae -*Sonchus/Launaea, Vernonia/Ageratum, Eclipta/Tridax;* Solanaceae -*Solanum nigrum, Withania;* Lamiaceae -*Salvia, Ocimum*; Liliaceae - *Asphodelus / Lilium / Allium.* 7. Mounting of a properly dried and pressed specimen of any wild plant with herbarium label (to be submitted in the record book).

SEM-III		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC 1CT(C3T)	PROF.RACHANA BERA(R.B)	**DSC 1CT(C3T) : Plant Anatomy and Embryology Credits 04** **Unit 1: Meristematic and permanent tissues** Root and shoot apical meristems; Simple and complex tissues. **U nit 2: Organs** Structure of dicot and monocot root stem and leaf. **Unit 3: Secondary Growth** Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood (heartwood and sapwood). **U nit 4: Adaptive and protective systems** Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes. **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.
	PROF.SASWATI ROY(S.ROY)	**Unit 6: Pollination and fertilization** Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms. **Unit 7: Embryo and endosperm** Endosperm types, structure and functions; Dicot and monocot embryo; Embryo endosperm relationship. **Unit 8: Apomixis and polyembryony** Definition, types and practical applications.
DSC1CP(C3P)	PROF.RACHANA BERA(R.B)	**DSC1CP(C3P) : Plant Anatomy and Embryology(Practical) Credits 02** **Practical** 1. Study of meristems through permanent slides and photographs. 2. Tissues (parenchyma, collenchyma and sclerenchyma); Macerated xylary elements, Phloem (Permanent slides, photographs) 3. Stem: Monocot: *Zea mays;* Dicot: *Helianthus*; Secondary: *Helianthus* (only Permanent slides). 4. Root: Monocot: *Zea mays*; Dicot: *Helianthus*; Secondary: *Helianthus* (only Permanent slides). 5. Leaf: Dicot and Monocot leaf (only Permanent slides).
	PROF.SHAMBHU RANA(S.R)	6. Adaptive anatomy: Xerophyte (*Nerium* leaf); Hydrophyte (*Hydrilla* stem). 7. Structure of anther (young and mature), tapetum (amoeboid and secretory) (Permanent slides). 8.Types of ovules: anatropous, orthotropous, circinotropous, amphitropous/ campylotropous. 9. Female gametophyte: *Polygonum* (monosporic) type of Embryo sac Development (Permanent slides/photographs). 10. Ultrastructure of mature egg apparatus cells through electron micrographs. 11. Pollination types and seed dispersal mechanisms (including appendages, aril, caruncle) (Photographs and specimens). 12. Dissection of embryo/endosperm from developing seeds. 13. Calculation of percentage of germinated pollen in a given mediu

SEM-III		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
SEC-1	PROF.RACHANA BERA(R.B)	**SEC-1: Bio-fertilizers Credits 02** **SEC1T: Bio-fertilizers** **Unit 1:**General account about the microbes used as biofertilizer – Rhizobium – isolation, identification, mass multiplication, carrier based inoculants, Actinorrhizal symbiosis. **Unit 2:***Azospirillum:* isolation and mass multiplication – carrier based inoculant, associative effect of different microorganisms. *Azotobacter*: classification, characteristics – crop response to *Azotobacter* inoculum, maintenance and mass multiplication. **Unit 3:**Cyanobacteria (blue green algae), *Azolla* and *Anabaena azollae* association, nitrogen fixation, factors affecting growth, blue green algae and *Azolla* in rice cultivation. **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. **Unit 5:**Organic farming – Green manuring and organic fertilizers, Recycling of biodegradable municipal, agricultural and Industrial wastes – biocompost making methods, types and method of vermicomposting – field Application.
	PROF.SHAMBHU RANA(S.R)	**SEC-1: Nursery and Gardening Credits 02** **SEC1T: Nursery and Gardening** **Unit-1:**Nursery: definition, objectives and scope and building up of infrastructure fornursery, planning and seasonal activities - Planting - direct seeding and transplants. **Unit-2**:Seed: Structure and types - Seed dormancy; causes and methods of breaking dormancy - Seed storage: Seed banks, factors affecting seed viability, genetic erosion – Seed production technology - seed testing and certification. **Unit-3:**Vegetative propagation: air-layering, cutting, selection of cutting, collecting season, treatment of cutting, rooting medium and planting of cuttings - Hardening of plants – green house - mist chamber, shed root, shade house and glass house. **Unit-4:** Gardening: definition, objectives and scope - different types of gardening - landscape and home gardening - parks and its components - plant materials and design - computer applications in landscaping - Gardening operations: soil laying, manuring, watering, management of pests and diseases and harvesting. **Unit-5:** Sowing/raising of seeds and seedlings - Transplanting of seedlings - Study of cultivation of different vegetables: cabbage, brinjal, lady's finger, onion, garlic, tomatoes, and carrots - Storage and marketing procedures.

SEM-IV		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC1DT(C4T)	PROF.SASWATI ROY(S.ROY)	**DSC1DT(C4T): Plant Physiology and Metabolism Credits 04** **Unit 1: Plant-water relations** Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. **U nit 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. **Unit 3: Translocation in phloem** Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading. **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.
	PROF.SHAMBHU RANA(S.R)	**Unit 5: Respiration** Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway. **Unit 6: Enzymes** Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition. **Unit 7: Nitrogen metabolism** Biological nitrogen fixation; Nitrate and ammonia assimilation. **Unit 8: Plant growth regulators** Discovery and physiological roles of auxins, 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.

SEM-IV		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSC1DP(C4P)	PROF.RACHANA BERA(R.B)	**DSC1DP(C4P): Plant Physiology and Metabolism (Practical) Credits 02** **Practical** 1. Determination of osmotic potential of plant cell sap by plasmolytic method. 2. To study the effect of two environmental factors (light and wind) on transpiration by excised twig. 3. Calculation of stomatal index and stomatal frequency of a mesophyte and a xerophyte. 4. Demonstration of Hill reaction.
	PROF.SASWATI ROY(S.ROY)	5. Demonstrate the activity of catalase and study the effect of pH and enzyme concentration. 6. To study the effect of light intensity and bicarbonate concentration on O2 evolution in photosynthesis. 7. Comparison of the rate of respiration in any two parts of a plant. 8. Separation of amino acids by paper chromatography. **Demonstration experiments (any four)** 1. Bolting. 2. Effect of auxins on rooting. 3. Suction due to transpiration. 4. R.Q. 5. Respiration in roots.

SEM-IV		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
SEC-2	PROF.RACHANA BERA(R.B)	**SEC-2: Mushroom Culture Technology Credits 02** **SEC2T: Mushroom Culture Technology** **Unit-1:**Introduction, history. Nutritional and medicinal value of edible mushrooms;Poisonous mushrooms. Types of edible mushrooms available in India - *Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus*. **Unit-2:** Cultivation Technology : Infrastructure: substrates (locally available) Polythene bag, vessels, Inoculation hook, inoculation loop, low cost stove, sieves, culture rack, mushroom unit (Thatched house) water sprayer, tray, small polythene bag. Pure culture: Medium, sterilization, preparation of spawn, multiplication. Mushroom bed preparation - paddy straw, sugarcane trash, maize straw, banana leaves. Factors affecting the mushroom bed preparation - Low cost technology, Composting technology in mushroom production. **Unit-3:** Storage and nutrition : Short-term storage (Refrigeration - upto 24 hours) Long term Storage (canning, pickels, papads), drying, storage in saltsolutions. Nutrition - Proteins - amino acids, mineral elements nutrition - Carbohydrates, Crude fibre content - Vitamins. **Unit-4:** Food Preparation_: Types of foods prepared from mushroom. Research Centres - National level and Regional level._Cost benefit ratio - Marketing in India and abroad, Export Value.
	PROF.BISWAJIT PRADHAN(B.P)	**0R** **SEC-2: Herbal Technology Credits 02** **SEC2T: Herbal Technology** **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. **Unit-2:** Pharmacognosy - systematic position m edicinal uses of the following herbs in curing various ailments; Tulsi, Ginger, Fenugreek, Indian Goose berry and Ashoka. **Unit-3:** Phytochemistry - active principles and methods of their testing - identification andutilization of the medicinal herbs; *Catharanthus roseus* (cardiotonic), *Withania somnifera* (drugs acting on nervous system), *Clerodendron phlomoides* (anti-rheumatic) and *Centella asiatica* (memory booster). **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) **Unit-5:** Medicinal plant banks micro propagation of important species (*Withania somnifera*, neem and tulsi- Herbal foods-future of pharmacognosy)

SEM-V		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSE1T	PROF.SASWATI ROY(S.R)	**DSE1T: Cell and Molecular Biology Credits 04** **Unit 1: Techniques in Biology** Principles of microscopy; Light Microscopy; Phase contrast microscopy; Fluorescence microscopy; Confocal microscopy; Sample Preparation for light microscopy; Electron microscopy (EM) - Scanning EM and Scanning Transmission EM (STEM); Sample preparation for electron microscopy; X-ray diffraction analysis. **Unit 2: Cell as a unit of Life** The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape; Eukaryotic Cell components. **Unit 3: Cell Organelles** Mitochondria : Structure, marker enzymes, composition; Semiautonomous nature; Symbiont hypothesis; Proteins synthesized within mitochondria; mitochondrial DNA. Chloroplast Structure, marker enzymes, composition; semiautonomous nature, chloroplast DNA. ER, Golgi body & Lysosomes : Structures and roles. Peroxisomes and Glyoxisomes :Structures, composition, functions in animals and plants and biogenesis. Nucleus :Nuclear Envelope-structure of nuclear pore complex; chromatin; molecular organization, DNA packaging in eukaryotes, euchromatin and heterochromatin, nucleolus and ribosome structure (brief).
	PROF.SHAMBHU RANA(S.R)	**Unit 4: Cell Membrane and Cell Wall** The functions of membranes; Models of membrane structure; The fluidity of membranes; Membrane proteins and their functions; Carbohydrates in the membrane; Faces of the membranes; Selective permeability of the membranes; Cell wall. **Unit 5: Cell Cycle** Overview of Cell cycle, Mitosis and Meiosis; Molecular controls. **Unit 6: Genetic material** DNA : Miescher to Watson and Crick- historic perspective, Griffith's and Avery's transformation experiments, Hershey-Chase bacteriophage experiment, DNA structure, types of DNA, types of genetic material. DNA replication (Prokaryotes and eukaryotes): bidirectional replication, semi–conservative, semi discontinuous RNA priming, Ǿ (theta) mode of replication, replication of linear, ds-DNA, replicating the 5′end of linear chromosome including replication enzymes. **Unit 7: Transcription (Prokaryotes and Eukaryotes)** Types of structures of RNA (mRNA, tRNA, rRNA), RNA polymerase - various types; Translation (Prokaryotes and eukaryotes), genetic code. **Unit 8: Regulation of gene expression** Prokaryotes:Lac operon and Tryptophan operon ; and in Eukaryotes.

SEM-III		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSE1P	PROF.RACHANA BERA(R.B)	**DSE1P: Cell and Molecular Biology (Practical) Credits 02** **Practical** 1. To study prokaryotic cells (bacteria), viruses, eukaryotic cells with the help of light and electron micrographs. 2. Study of the photomicrographs of cell organelles 3. To study the structure of plant cell through temporary mounts. 4. To study the structure of animal cells by temporary mounts-squamous epithelial cell and nerve cell. 5. Preparation of temporary mounts of striated muscle fiber 6. To prepare temporary stained preparation of mitochondria from striated muscle cells /cheek epithelial cells using vital stain Janus green. 7. Study of mitosis and meiosis (temporary mounts and permanent slides). 8. Study the effect of temperature, organic solvent on semi permeable membrane. 9. Demonstration of dialysis of starch and simple sugar. 10. Study of plasmolysis and deplasmolysis on *Rhoeo* leaf. 11. Measure the cell size (either length or breadth/diameter) by micrometry. 12. Study the structure of nuclear pore complex by photograph (from Gerald Karp) development, arrangement and diversity in size and shape of leaves; Structure of dicot and monocot leaf, Kranz anatomy. Organization of root apex (Apical cell theory, Histogen theory, Korper-Kappe theory); Quiescent centre; Root cap; Structure of dicot and monocot root; Endodermis, exodermises and origin of lateral root. 13. Study of special chromosomes (polytene & lampbrush) either by slides or photographs. 14. Study DNA packaging by micrographs. 15. Preparation of the karyotype and ideogram from given photograph of somatic metaphase chromosome.

SEM-V		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
SEC-3	PROF.BISWAJIT PRADHAN(B.P)	**SEC-3: Ethnobotany Credits 02** **SEC3T: Ethnobotany** **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. **Unit-2: Methodology of Ethnobotanical studies** a) Field work b) Herbarium c) Ancient Literature d) Archaeological findings e) temples and sacred places. **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) *Azadiractha indica* b) *Ocimum sanctum* c) *Vitex negundo*. d) *Gloriosa superba* e) *Tribulus terrestris* f) *Pongamia pinnata* g) *Cassia auriculata* h) *Indigofera tinctoria*. Role of ethnobotany in modern medicine with special example *Rauvolfia sepentina, Trichopus zeylanicus, Artemisia,Withania*. Role of ethnic groups in conservation of plant genetic resources. Endangered taxa and forest management (participatory forest management). **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.

SEM-VI		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSE2T	PROF.RACHANA BERA(R.B)	**DSE2T: Genetics and Plant Breeding Credits 04** **Unit 1: Heredity** 1. Brief life history of Mendel 2. Terminologies 3. Laws of Inheritance 4. Modified Mandelian 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 Mirabilis jalapa, Male sterility. 8. Multiple allelism 9. Pleiotropism 10. Chromosome theory of Inheritance. **Unit 2: Sex-determination and Sex-linked Inheritance** **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.
	PROF.SHAMBHU RANA(S.R)	**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. **Unit 5: Plant Breeding** Introduction and objectives. Breeding systems: modes of reproduction in crop plants. Important achievements and undesirable consequences of plant breeding. **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. **Unit 7: Quantitative inheritance** Concept, mechanism, examples. Monogenic vs polygenic Inheritance. **Unit 8: Inbreeding depression and heterosis** History, genetic basis of inbreeding depression and heterosis; Applications. **Unit 9: Crop improvement and breeding** Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.

SEM-VI		
PAPER	**TEACHER**	**DETAILED SYLLABUS**
DSE2P	PROF.RACHANA BERA(R.B)	**DSE2P: Genetics and Plant Breeding(Practical) Credits 02** **Practical** 1. Mendel's laws through seed ratios. Laboratory exercises in probability and chisquare. 2. Chromosome mapping using point test cross data. 3. Pedigree analysis for dominant and recessive autosomal and sex linked traits. 4. Incomplete dominance and gene interaction through seed ratios (9:7, 9:6:1, 13:3, 15:1, 12:3:1, 9:3:4). 5. Study of aneuploidy: Down's, Klinefelter's and Turner's syndromes through photographs. 6. Photographs/Permanent Slides showing Translocation Ring, Laggards and Inversion Bridge. 7. Hybridization techniques - Emasculation, Bagging (For demonstration only). 8. Induction of polyploidy conditions in plants (For demonstration only).
SEC-4	PROF.SHAMBHU RANA(S.R)	**SEC-4: Medicinal Botany Credits 02** **SEC4T: Medicinal Botany** **Unit-1:** History, Scope and Importance of Medicinal Plants. Indigenous Medicinal Sciences; Definition and Scope-Ayurveda: History, origin, panchamahabhutas, saptadhatu and tridoshaconcepts, Rasayana, plants used in ayurvedic treatments, Siddha: Origin of Siddha medicinal systems, Basis of Siddha system, plants used in Siddha medicine. Unani: History, concept: Umoor-e- tabiya, tumors treatments/ therapy, polyherbal formulations. **Unit-2:** Conservation of endangered and endemic medicinal plants. Definition: endemic and endangered medicinal plants, Red list criteria; In situ conservation: Biosphere reserves, sacred groves, National Parks; Ex situ conservation: Botanic Gardens, Ethnomedicinal plant Gardens. Propagation of Medicinal Plants: Objectives of the nursery, its classification, important components of a nursery, sowing, pricking, use of green house for nursery production, propagation through cuttings, layering, grafting and budding. **Unit- 3:** Ethnobotany and Folk medicines. Definition; Ethnobotany in India: Methods to study ethnobotany; Applications of Ethnobotany: National interacts, Palaeo-ethnobotany. folk medicines of ethnobotany, ethnomedicine, ethnoecology, ethnic communities of India. Application of natural products to certain diseases- Jaundice, cardiac, infertility, diabetics, Blood pressure and skin diseases.