**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc. I (1st Sem.) BOTANY**

**Name of Asst. Prof: Dr. Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc. 1st medical Subject : Biodiversity of Microbes, Algae and Fungi ( BOT 101L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | Viruses:- Discovery, general characteristics, replication, DNA virus(T-phage); |
| 4th | Lytic and lysogenic cycle, RNA virus(TMV), Economic Importance of Viruses. |
| **November** | 1st | Bacteria:- Discovery,General characteristics and cell structure; Reproduction-vegetative, asexual |
| 2nd | Reproduction-vegetative, asexual and recombination(conjugation, transformation and transduction); Economic importance of bacteria. |
| 3rd | Algae:- General characteristics; Range of thallus organization and reproduction; Classification of algae upto classes(Lee, 1980); assignment |
| 4th | Morphology and life-cycles of the following: Nostoc, Volvox, Oedogonium, |
| **December** | 1st | Morphology and life-cycles of the following:Ectocarpus and Polysiphonia; Economic importance of algae. |
| 2nd | Fungi:- Introduction- General characteristics, economic importance, reproduction and classification upto classes(Ainsworth, 1966); |
| 3rd | Morphology and life cycles of Rhizopus, Penicillium, Unit test |
| 4th | Morphology and life cycles of Puccinia, Agaricus, and Colletotrichum |
| **January** | 1st | Causal organism, symptoms and control of following plant diseases; Rustof wheat, white rust of crucifers, late blight of potato, and red rot of sugarcane. |
| 2nd | Lichens: General account and significance |
| 3rd | Revision and class test |
| 4th | Revision and class test |

**HOD Botany**

**Lesson plan (2021-22) ODD Semester**

**B.Sc. I (Ist Sem.) BOTANY**

**Name of Asst/Associate Prof: Dr. Asha Name of the Department: Botany**

**Class: B.Sc. I Medical Ist sem Subject : Biodiversity of Archegoniates ( BOT 102 L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | Archegoniates:- Unifyling features of archegoniates, Transition to land habit, Alternation of generations |
| 4th | General account of Paleobotany; Types of fossils and process of fossilization. |
| **November** | 1st | Study of fossil plants; Rhynia and Lyginopteris |
| 2nd | Bryophytes:- General characteristics, Range of habitat and thallus organization. |
| 3rd | morphology, anatomy and reproduction of marchantia, Anthoceros |
| 4th | morphology, anatomy and reproduction of Funaria. Economic importance of Bryophytes. Unit test |
| **December** | 1st | Pteridophytes:- General characteristics, Classification up to Classes, morphology, anatomy and reproduction of Selaginella, assignment |
| 2nd | morphology, anatomy and reproduction of Equisetum and pteris. |
| 3rd | Heterospory and seed habit. Economic importance of pteridophytes |
| 4th | Gymnosperms:- General characteristics, Classification up to classes, |
| **January** | 1st | morphology, anatomy and reproduction of Cycas . |
| 2nd | morphology, anatomy and reproduction of Pinus. |
| 3rd | Ecological and Economic importance of Gymnosperms, Class tests |
| 4th | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc. II (3rd Sem.) BOTANY**

**Name of Asst/Associate Prof: Dr. Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc. II Medical 3rd sem Subject : Plant Anatomy ( BOT 301L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | Root and shoot apical meristems |
| 4th | Simple and complex tissues |
| **November** | 1st | Theories of shoot apex. |
| 2nd | Structure of dicot and monocot root stem and leaf, |
| 3rd | Stomata and its types, epidermal hairs, Trichomes |
| 4th | Vascular cambium – structure and function, seasonal activity, Unit test |
| **December** | 1st | Secondary growth in root and stem, Wood (heartwood and sapwood). |
| 2nd | .Anamolous secondary growth in Boehravia and Dracaena. |
| 3rd | Epidermis, cuticle. Assignment |
| 4th | Anatomical aspects of adaptations in xerophytes, |
| **January** | 1st | Anatomical aspects of adaptations in, hydrophytes, |
| 2nd | Anatomical aspects of adaptations in halophytes |
| 3rd | Revision and class test |
| 4th | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc. II (3rd Sem.) BOTANY**

**Name of Asst/Associate Prof: Dr. Asha Name of the Department: Botany**

**Class: B.Sc. II Medical 3rd sem Subject : Plant Embryology ( BOT 302L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | Structural organization of flower ,Structure of anther and pollen |
| 4th | Structure and types of ovules; Types of embryo sacs |
| **November** | 1st | organization and ultrastructure of mature embryo sac.Placentation-Types. |
| 2nd | Pollination and fertilization--Pollination mechanisms and adaptations |
| 3rd | Pollination mechanisms and adaptations. Unit test |
| 4th | Double fertilization; Seed-structure appendages and dispersal mechanisms. |
| **December** | 1st | Seed-structure appendages and dispersal mechanisms. Assignment |
| 2nd | Embryo and endosperm; Endosperm types, structure and functions, assignment |
| 3rd | Dicot and monocot embryo; |
| 4th | Endosperm types, Embryo-endosperm relationship |
| **January** | 1st | Apomixis -Definition, types and practical applications |
| 2nd | Polyembryony -Definition, types and practical applications |
| 3rd | Class tests and revision |
| 4th | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc. II (3rd Sem.) BOTANY**

**Name of Asst/Associate Prof: Dr. Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc. II Medical 3rd sem Subject : Ethnobotany ( BOT 304L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | Ethnobotany:-Introduction, concept, scope and objectives,  Ethnobotany as an interdisciplinary science, Major and minor ethnic groups or Tribals of India, and their life styles |
| 4th | Plants used by the tribals: a) Food plants b) intoxicants and beverages c) Resins and oils and miscellaneous uses. |
| **November** | 1st | Methodology of Ethnobotanical studies a) Field work b) Herbarium c) Ancient Literature d) Archaeological findings e) temples and sacred places. Unit test |
| 2nd | 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*) Azadiracta indica* b) *Ocimum sanctum* |
| 3rd | Significance of the following plants in ethno botanical practices (along with their habitat and morphology) c) *Vitex negundo*. d) *Gloriosa superba* e) *Tribulus terrestris* |
| 4th | Significance of the following plants in ethno botanical practices (along with their habitat and morphology)f) *Pongamia pinnata* *g) Cassia auriculata* h*) Indigofera tinctoria. Assignment* |
| **December** | 1st | Role of ethnobotany in modern medicine with special example of *Trichopus zeylanicus, Artemisia,Withania.* |
| 2nd | Role of ethnic groups in conservation of plant genetic resources. |
| 3rd | Endangered taxa and forest management (participatory forest management). |
| 4th | Ethnobotany and legal aspects-Ethnobotany as a tool to protect interests of ethnic groups |
| **January** | 1st | Sharing of wealth concept with few examples from India.Biopiracy, |
| 2nd | Intellectual Property Rights and Traditional Knowledge. |
| 3rd | Class tests and Revision |
| 4th | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc.III (5th Sem.)**

**Name of Asst/Associate Prof; Dr. Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc. III Medical Subject : Cell Biology ( BOT 501L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | The Cell Theory; Prokaryotic and eukaryotic cells; Cell size and shape |
| 4th | Eukaryotic Cell components.Cell Cycle: Overview of Cell cycle |
| **November** | 1st | Mitosis and Meiosis; Molecular controls |
| 2nd | Mitochondria: Structure, marker enzymes, composition; Semiautonomous nature; Symbiont hypothesis; Proteins synthesized within mitochondria; mitochondrial DNA |
| 3rd | Chloroplast Structure, marker enzymes, composition; semiautonomous nature, chloroplast DNA |
| 4th | .ER, Golgi body & Lysosomes: Structures and roles. Unit test |
| **December** | 1st | Peroxisomes and Glyoxisomes: Structures, composition, functions in animals and plants and biogenesis. Assignment |
| 2nd | Nucleus: Nuclear Envelope- structure of nuclear pore complex; chromatin; molecular organization |
| 3rd | DNA packaging in eukaryotes, euchromatin and heterochromatin, nucleolus and ribosome structure (brief). |
| 4th | The functions of membranes; Models of membrane structure; The fluidity of membranes |
| **January** | 1st | ; Membrane proteins and their functions; Carbohydrates in the membrane; Faces of the membranes |
| 2nd | Selective permeability of the membranes; Cell wall. |
| 3rd | Revision and class test |
| 4th | Revision |

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) ODD Semester**

**B.Sc.III (5th Sem.)**

**Name of Asst/Associate Prof; Dr. Asha Name of the Department: Botany**

**Class: B.Sc. III Medical Subject : Molecular Biology ( BOT 502L)**

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| **Month** | **Week** | **Topic** |
| **October** | 3rd | **Genetic material and DNA Replication**  DNA: Miescher to Watson and Crick- historic perspective, Griffith’s and Avery’s transformation experiments, Hershey-Chase bacteriophage experiment |
| 4th | DNA structure, types of DNA, types of genetic material. DNA replication (Prokaryotes and eukaryotes): bidirectional replication, semi–conservative, semidiscontinuous RNA priming, replication of linear dsDNA, replicating the 5 ́end of linear chromosome including replication enzymes. |
| **November** | 1st | . DNA replication (Prokaryotes and eukaryotes): continues, Assignment |
| 2nd | RNA structure and types of RNA, Transcription in prokaryotes: Prokaryotic RNA polymerase, role of sigma factor, promoter, initiation, elongation and termination of RNA chains. |
| 3rd | Transcription in eukaryotes: Eukaryotic RNA polymerase , Unit test |
| 4th | Genetic code and its characteristics, prokaryotic and eukaryotic translation: ribosome structure and assembly, charging of tRNA, aminoacyltRNAsynthetase, mechanism ofinitiation, elongation and termination of polypeptides, |
| **December** | 1st | Translation in eukaryotes, |
| 2nd | Regulation of gene expression in prokaryotes: Operon concept (inducible and repressible system). |
| 3rd | Introduction to electrophoresis, agarose gel electrophoresis, acrylamide gel electrophoresis, Immuno-electrophoresis |
| 4th | , PCR and its variants, application of PCR |
| **January** | 1st | Principles of microscopy; Light and Phase contrast microscopy; Electron microscopy (EM)- Scanning EM and Scanning Transmission EM (STEM). |
| 2nd | Electron microscopy (EM)- Scanning EM and Scanning Transmission EM |
| 3rd | Revision |
| 4th | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) Even Semester**

**B.Sc. I (2nd Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr. Asha Name of the Department: Botany**

**Class: B.Sc. I Medical Subject : Plant Ecology (BOT 201 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | Introduction to Ecology: Basic concepts, types and Scope of Ecology. Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, |
| 2nd | Effect of light and temperature on plants.Morphological and anatomical adaptation of hydrophytes and xerophytes. |
| 3rd | **: Ecosystem**  Structure; energy flow trophic levels; Food chains and food webs, Ecological pyramids |
| 4th | Biogeochemical cycles; Hydrological, Carbon, Nitrogen and Phosphorous. Unit test |
| **May** | 1st | **: Plant Communities and Phytogeography**  Qualitative and quantitative characters; Ecotone and edge effect; Succession. Assignment |
| 2nd | Process and types (Hydrosere and Xerosere).Phytogeographical regions of India, Endemism. |
| 3rd | **: Pollution and Environmental Laws**  Definition, Types, Sources, Control of Air, and Water Pollution |
| 4th | **: Pollution and Environmental Laws**  Definition, Types, Sources, Control of Soil Pollution, A basic knowledge of Environment Protection Act, 1986. |
| **June** | 1st | Revision and class test |
| 2nd | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) Even Semester**

**B.Sc. I (2nd Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr. Hoshiar singh Name of the Department: Botany**

**Class: B.Sc. I Medical Subject : Plant Taxonomy (BOT 202 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | Identification, Classification, Nomenclature.Ranks, categories and taxonomic groups.Principles and rules (ICN); ranks and names; |
| 2nd | binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations. |
| 3rd | Types of classification- artificial, natural and phylogenetic. Bentham and Hooker system of classification (upto series), Angiosperm Phylogeny Group (APG)- general introduction. Assignment |
| 4th | Herbarium: general introduction and importance. Botanical gardens of the world (Royal Botanic Garden, Kew)and India (AcharyaJagdish Chandra Bose Indian Botanical Garden, Kolkata), |
| **May** | 1st | Introduction to Botanical Survey of India (BSI Dehradun); Documentation: Introduction to Floras,monograph and journals, Keys: single access and multi-access |
| 2nd | Taxonomic evidences from cytology, phytochemistry and molecular dataBiometrics. Unit test |
| 3rd | : Characters; variations; OTUs, character weighting and coding; cluster analysis; phenorograms, cladograms (definitions and differences). |
| 4th | Salient features, vegetative, floral characters and economic importance of the following families: ***Ranunculace****,* ***Brassicaceae****;* ***Leguminosae****,* |
| **June** | 1st | Salient features, vegetative, floral characters and economic importance of the following families:*,****Asteraceae****;****Solanaceae****;* ***Lamiaceae, Liliaceae, Poaceae*** |
| 2nd | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) Even Semester**

**B.Sc. II (4th Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr. Asha Name of the Department: Botany**

**Class: B.Sc II medical (4th sem ) Subject : Plant Physiology(BOT 401 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | **Plant-water relations**  Importance of water, Osmosis, Imbibition, Plasmolysis, Water potential and its components |
| 2nd | Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation. Assignment |
| 3rd | **Mineral nutrition**  Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements |
| 4th | Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.  **Unit test** |
| **May** | 1st | **Translocation**  Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading, Factors affecting translocation |
| 2nd | **Plant growth regulators and Photoperiodism**  Discovery and physiological roles of auxins, gibberellins. Assignment |
| 3rd | Discovery and physiological roles of cytokinins, ABA and ethylene |
| 4th | Photoperiodism (SDP, LDP, Day Neutral Plants); Phytochrome (Discovery & Structure); Vernalization. |
| **June** | 1st | Revision and class test |
| 2nd | Revision |

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR )**

**Lesson plan (2021-22) Even Semester**

**B.Sc. II (4th Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr. Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc II medical (4th sem ) Subject : Plant Metabolism(BOT 402 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules |
| 2nd | C3, C4 and CAM pathways of carbon fixation |
| 3rd | Cranzanatomy, Factors affecting rate of photosynthesis, Photorespiration. |
| 4th | Glycolysis, Anaerobic respiration, TCA cycle. Assignment |
| **May** | 1st | Electron Transport Chain, Oxidative phosphorylation |
| 2nd | Glyoxylate Cycle, Oxidative Pentose Phosphate Pathway. Unit test |
| 3rd | Structure and properties; Enzyme vs Chemical catalyst, Nomenclature and Classification |
| 4th | Mechanism of enzyme action and enzyme inhibition. |
| **June** | 1st | Biological nitrogen fixation; Nitrate and ammonia assimilation |
| 2nd | Structure and functions of Fatty acids lipids, Fatty acids biosynthesis and degradation |

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR)**

**Lesson plan (2021-22) Even Semester**

**B.Sc. III (6th Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr. Asha Name of the Department: Botany**

**Class: B.Sc. 6th sem  Subject : Economic Botany**

**(BOT 601 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | **Origin of Cultivated Plants**  Concept of centres of origin, their importance with reference to Vavilov’swork |
| 2nd | Cereals: Wheat and Rice-Origin, morphology, uses. Assignment |
| 3rd | **Legumes and Spices**  General account with special reference to Gram, pea, arhar and soybean |
| 4th | Spices*:* General account with special reference to clove, ginger, turmeric and black pepper (Botanical name, family, part used, morphology and uses) . |
| **May** | 1st | Tea, coffee and cocoa (morphology, processing, and uses); unit test |
| 2nd | Oils and Fats:General description with special reference to groundnut, mustard, coconut |
| 3rd | **Fibre Yielding Plants**  General description with special reference to Cotton, (Botanical name, family, part used, morphology and uses) |
| 4th | **Fibre Yielding Plants**  General description with special reference to Jute and Coir, (Botanical name, family, part used, morphology and uses) |
| **June** | 1st | Revision and class test |
| 2nd | Revision |

**HOD Botany**

**F.G.M. GOVT. COLLEGE ADAMPUR (HISAR)**

**Lesson plan (2021-22) Even Semester**

**B.Sc. III (6th Sem.)**

**BOTANY**

**Name of Asst/Associate Prof: Dr.Hoshiar Singh Name of the Department: Botany**

**Class: B.Sc. 6th sem  Subject : Biotechnology (BOT 602 L)**

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| **Month** | **Week** | **Topic** |
| **April** | 1st | Plant tissue culture, Micropropagation; haploid production through androgenesis and gynogenesis |
| 2nd | brief account of embryo & endosperm culture with their applications . Assignment |
| 3rd | Restriction endonucleases, DNA restriction digestion and ligation, Plasmid and Cloning vectors |
| 4th | PCR and its application, Blotting techniques: Northern, Southern and Western Blotting, DNA Fingerprinting |
| **May** | 1st | Molecular DNA markers i.e. RAPD, RFLP, AFLP, ISSR, SNPs. Unit test |
| 2nd | DNA sequencing, Hybridoma technology and monoclonal antibodies. |
| 3rd | Molecular diagnosis of human disease, Human gene Therapy, automation in diagnostic techniques |
| 4th | , rapid diagnostic approach including purification and standardisation of antigen and specific antibodies |
| **June** | 1st | ELISA and Immunodetection |
| 2nd | Revision |

**HOD Botany**