**Lesson Plan – Botany Department**

**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Archana Soota

Class – B.Sc Botany (Hons.) 1st semester

Subject- MYCOLOGY AND PHYTOPATHOLOGY

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | - | - |
| October 2021 | Introduction to Mycology- General characteristics; Ecology and Distribution; Thallus organization; EM of haustorium and septum; Wall composition; Nutrition; Growth; Reproduction and spores; Heterokaryosis and parasexuality; Sexual compatibility; Life cycle patterns.  Role of fungi in various field of science. | Class test on the topics taught |
| November 2021 | Myxomycota- Introduction, Occurrence; Importance (Physrum as an experimental tool); General characteristics; Thallus organization; Reproduction.  Oomycota General characteristics; Ecology; Significance; Thallus organization; Reproduction; Classification; Generalized life cycle of the class with special emphasis on the reproductive structures of Phytophthora, Albugo.  Zygomycota- General characteristics; Ecology; Significance; Thallus organization; Reproduction; with special reference to Rhizopus. Ascomycota General characteristics; Ecology; Significance; Thallusorganization; Reproduction; Classification with special reference to Yeasts (Saccharomyces),Eurotium (Aspergillus), Penicillium, General account of Powdery mildews, Neurospora, Peziza. Basidiomycota General characteristics; Ecology; Significance; Thallus organization; Reproduction; Classification with special reference to Wheat Rusts (Puccinia), Loose & Covered Smuts. | Group discussion and Assignment |
| December 2021 | Mushrooms (Agaricus); Mushroom cultivation. Deuteromycota- General characteristics;Ecology, Significance; Thallus organization; Reproduction; Classification with special reference to Alternaria, and Colletotrichum. Lichens; Occurrence, General Characteristics; Growth forms and range of thallus organization; Nature of association of algal and fungal partners; Reproduction; Ecological significance; Applied importance. | Class test |
| January 2022 | Introduction: Definition; Importance; Terms and Concepts; Classification; Causes; Symptoms; Host- Pathogen relationships Geographical distribution of diseases; etiology; symptomology; disease cycle and environmental relation; prevention and control of plant diseases, and role of quarantine. | Revision and doubt clearing session |
| February 2022 | Examination |  |

**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Archana Soota

Class – B.Sc Botany (Hons.) 1st Semester

Subject- ALGAE AND MICROBIOLOGY

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | - | - |
| October 2021 | General characteristics; Ecology and distribution; range of thallus organization; Cell structure and Components; cell wall, pigment system, reserve food (of only groups represented in the syllabus), flagella; and methods of reproduction, classification; criteria, system of Fritsch, and evolutionary classification of Lee (only upto groups); significant contributions of important phycologists (F.E.Fritsch, G.M. Smith, R.N. Singh, T.V. Desikachary, H.D. Kumar, M.O.P. Iyengar). Role of algae in ecosystem; aquaculture, industry, biotechnology and agriculture. | Assignment on contribution of various phycologist |
| November 2021 | Cyanophyta: Ecology and distribution; thallus organization; cell structure; chromatic adaptation;physiology; reproduction; economic importance; role in biotechnology; morphology and life cycle of Nostoc Chlorophyta: General characteristics; range of thallus organization; pigment systems; methods of reproduction; evolutionary significance of Prochloron; morphology and life cycles of Chlamydomonas, Volvox, Oedogonium, Coleochaete Charophyta: General characteristics; morphology and life cycle of Chara; fossils, evolutionary significance  Xanthophyta: General, characteristics; range of thallus organization; methods of reproduction;morphology and life cycle of Vaucheria Phaeophyta: General characte/ristics; range of thallus structure; methods of reproduction;morphology and life cycles of Ectocarpus and Fucus. Rhodophyta: General characteristics; range of thallus organization; methods of reproduction;morphology and life cycles of Polysiphonia | Class test |
| December 2021 | Introduction to microbial world, microbial nutrition, growth and metabolism. Virus : Discovery, physiochemical and biological characteristics;Classification; replication, lyticand lysogenic cycle ; special types: DNA virus (coliphage T-2), RNA virus (TMV). Economicimportance; Symptoms, Transmission and management of diseases caused by viruses on plants. Bacteria- general characteristics, comparison of Archaebacteria and Eubacteria , Wall-less forms Mycoplasma and sphaeroplasts), cell structure, nutrition; reproduction: vegetative, asexual, sexual (conjugation, transformation , transduction ), Economic importance. | Assignment on Virus and bacterial life cycle |
| January 2022 | Microbial culturing technique, culture media, and microbial growth, microbes used inagriculture, mycorrhizae, environmental management and industry, Indian Institutes and their research activities in microbiology | Group discussion on research activities |
| February 2022 | Examination |  |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Archana Soota

Class – B.Sc Zoology (hons.) 1st Semester

Subject- Botany I- (Plant Diversity-105)

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | - | - |
| October 2021 | Salient features, habitat, range of thallus structure, reproduction and broad classification of algae; General account, classification and reproduction in fungi; Brief account of Lichen and Mycorrhiza; Economic importance of algae, fungi and lichens. | Assignment on Economic importance of algae, fungi and lichens. |
| November 2021 | Bryophytes and Pteridophytes: General characteristics, broad classification and reproduction in Bryophytes and Pteridophytes; Ecological and Economic importance of Bryophytes; Evolution of stelar system and seed habit in Pteridophytes | Group Discussion on Evolution of stelar system and seed habit in Pteridophytes |
| December 2021 | Gymnosperms: Salient features and diagnostic characters of; Distribution in India, Pteridospermic seeds and evolution of seed habit in gymnosperms, Economic Importance with reference to Wood, Resins, Essential oils and Drugs | Assignment on economic importance of gymnosperm |
| January 2022 | Angiosperms and Taxonomy: Botanical nomenclature and Elementary knowledge of International Code of Botanical Nomenclature, Role of Herbaria and Botanical Gardens, Broad outline of Bentham & Hooker system of classification with merits and demerits | Class test and Doubt clearing sessions |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Mrs. Anita Rathee**

**Class – BSc Medical Ist Sem**

**Subject- Diversity of microbes**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | **Bacteria:** Structure, nutrition, reproduction and economic importance **Cyanobacteria**: General characters; life-history of *Nostoc* **Algae:** General characters, classification (upto classes) and economic importance; General account of algal blooms | Assignment 1 |
| November 2021 | Important features and life-history (excluding development) of *Volvox*, *Oedogonium* (Chlorophyceae), *Vaucheria* (Xanthophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae) | Assignment 2 |
| December 2021 | **Viruses:** General account of Viruses including structure of TMV and Bacteriophages  **Fungi:** General characters, classification (upto classes) and economic importance;  General account of Lichens | Test 1 |
| January 2022 | Important features and life-history of *Phytophthora* (Mastigomycotina), *Mucor*  (Zygomycotina), *Penicillium* (Ascomycotina), *Puccinia*, *Agaricus* (Basidiomycotina),  *Colletotrichum* (Deuteromycotina) | Test 2 |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Mrs. Anita Rathee**

**Class – BSc Medical Ist Sem**

**Subject- Cell biology**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | **The Cell Envelopes**: Structure and functions of Cell Wall, Plasma Membrane,  Golgi Apparatus, Endoplasmic Reticulum, Lysosomes, Peroxisomes and Vacuoles | Assignment 1 |
| November 2021 | **Ultra-structure and function**: Chloroplast, Mitochondria, Nucleus and Nucleolus  **Chromosome**: Morphology, ultra-structure - kinetochore, centromere and telomere | Assignment 2 |
| December 2021 | **Cell Cycle:** General account  **Cell Division**: Mitosis and Meiosis - Stages and Significance | Test 1 |
| January 2022 | **Chromosomal aberrations**: Structural and Numerical - deletions, duplications,  translocations, inversions, aneuploidy, polyploidy  Sex chromosomes and Sex determination in Plants | Test 2 |
| February 2022 | Examination |  |
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**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Mrs. Anita Rathee**

**Class – B.Sc. Pass Course Medical 5th sem**

**Subject- Ecology (5.2)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Introduction to ecology , definition and its scope.  importance of ecology and its level of organization.  introduction to environment and environmental factors. climatic factors [water, humidity, wind, light, temperature] | Test |
| October 2021 | Edaphic factors [soil profile, its formation, physico-chemical properties of soil]  topographic and biotic factors[ species interaction  Adaptations of plants to water stress and salinity.  morphological and anatomical features of hydrophytes and xerophytes. |  |
| November 2021 | morphological and anatomical features of halophytes and introduction to population ecology.  characteristics of population ecology, biotic potential. growth curves , ecotypes and ecads.  concept of community ecology, qualitative characteristics of community ecology,  quantitative and analytical characteristics of community ecology | Test |
| December 2021 | synthetic characteristics of community ecology, method of analysis.Ecological succession  introduction to ecosystem  structural components of ecosystem  functions of ecosystem like trophic levels, food chain, food web. ecological pyramids and energy flow. Biogeochemical cycle.carbon, nitrogen, phosphorus cyclehydrological cycle |  |
| January 2022 | introduction to phytogeography.  phytogeographical regions of India. vegetation types of India. environmental pollution, types, sources and control of air and water pollution. green house effect and green house gases, impacts of global warming, carbon tradingozone layer depletion and biomagnification. | Assignment |
| February 2022 | Examination |  |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Dr. Anjana Anand

Class – B.Sc. Botany Hons. 5th sem.

Subject- Biostatistics, BOT 503

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Measures of central tendency: Mean, median and mode. Measures of dispersion; skewness, kurtosis. . Graphical representation of data. | Test on the topics taught |
| October 2021 | Discrete and Continuous Random variable, Mathematical Expectation, Mean and Variance of Binomial, Poisson and Normal distribution. Sample mean. | Test |
| November 2021 | Hypothesis testing using standard normal variate.Curve Fitting.Correlation and Regression.Emphasis on examples from Biological Sciences.Experimental design and sampling theories. | Test |
| December 2021 | Elementary Probability and basic laws**.**Probabilities theory; t- test, F- test and Chi square test | Test |
| January 2022 | Probability distributions and their properties, Sampling variance and coefficient of variation | Test and assignment  Revision of topics  Class Presentation by students |
| February 2022 | Examination | Revision |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Dr. Anjana Anand

Class – B.Sc. Botany Hons. 5th sem.

Subject-Plant Systematics and Evolution, BOT 501

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | What is systematics; Identification, Classification and Nomenclature of plants; Field inventory, valid publication; rejection of names, principle of priority and its limitation; names of  Hybrids and cultivars. Herbarium preparation and management; important herbaria and botanical gardens of the world and  India | Test on the topics taught |
| October 2021 | Documentation: Flora, Monographs, Journals, Online Journals and Keys; origin & evolution of angiosperms; co-evolution of angiosperms and animals; methods of  illustrating evolutionary relationship (phylogenetic tree, cladogram). | Test |
| November 2021 | Evidences from morphology, palynology, cytotaxonomy, chemotaxonomy, serology, and molecular systematics,Terms and concepts (homology, analogy, parallelism, convergence, monophyly, polyphyly,  clades) | Test |
| December 2021 | Concept of taxa; categories and hierarchy; species concept (taxonomic,  biological, evolutionary), Principles and rules of nomenclature; ranks and names; type method,  author citation | Test |
| January 2022 | Classification by Bentham and Hooker, Engler and Prantl & Takhtajan; brief reference of Angiosperm Phylogeny Group (APG) Classification, role of Computers in systematics; Characters and attributes; OTUs, character weighing and coding; cluster analysis, phenograms, cladistics | Test and assignment  Revision of topics  Class Presentation by students |
| February 2022 | Examination | Revision |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Rakhi kaushik

Class – B.Sc Medical IIIrd Semester

Subject- Botany

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | General characters, origin and evolution of Gymnosperms, Geological Time Table, Evolution of Seed Habit, Pilger and Melchior’s (1954) system of classification of Gymnosperms.  Tissues - meristematic and permanent (simple, complex and secretory) Tissue systems (Epidermal, ground and vascular) The Shoot system - shoot apical meristem and its histological organizations. | Class test on the topics taught |
| October 2021 | Palaeobotany- Fossils and Fossilization (Process involved, types of fossils and importance of fossils); Reconstruction of the following fossil plants: Lyginopteris Williamsonia Cycadeoidea (= Bennettites)  Cambium - structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm; Anomalous secondary growth (Dracaena, Boerhaavia and Achyranthes) | Assignment on the Fossils and Fossilization |
| November 2021 | Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of following plants: Cycas Pinus  Leaf: Types of leaves (simple and compound); phyllotaxy. Epidermis-uniseriate and ultiseriate, epidermal appendages and their morphological types. Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves, leaf abscission, Stomatal apparatus and their morphological types | Assignment on Monocot and dicot leaf |
| December 2021 | Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of Ephedra  Root system: Root apical meristem; histological organization Secondary growth in dicot root. | Test on the Ephedra |
| January 2022 | Economic importance of Gymnosperms General characters, origin and evolution of Angiosperms  Structural modifications in roots: Storage (Beta), Respiratory (Rhizophora), Epiphytic (Vanda) | Group discussion on the structural modifications, and doubt clearing sessions |

**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Rakhi Kaushik

Class – B.Sc Botany (Hons) 1st Semester

Subject- INTRODUCTION TO BIOLOGY

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | - | - |
| October 2021 | Introduction to concepts of biology Themes in the study of biology; A closer look at ecosystem and cell; The process of Science; Biology and everyday life; Evolutionary history of biological diversity early earth and the origin of life; Major events in the history of life; Mechanism of Macroevolution; Phylogeny and the tree of life. Classifying the diversity of life, Kingdoms of Life –Prokaryotes, Eukaryotes, Archaea; Darwinian view of life and origin of species Darwin’s theory of evolution; The evolution of populations; Concepts of species; Mechanism of speciation | Assignment on Speciation, Micro and Marcoevolution |
| November 2021 | Genetic approach to Biology, Patterns of inheritance and question of biology; Variation on Mendel’s Law; The molecular basis of genetic information; The flow of genetic information from DNA to RNA to protein; Genetic variation; Methodologies used to study genes and gene activities; Developmental noise; Detecting macromolecules of genetics; Model organisms for the genetic analysis; Distinction between Phenotype and Genotype | Group Discussion |
| December 2021 | Chemistry of life, The constituents of matter; Structure of an atom; The energy level of electron; The formation and function of molecules depend on chemical bonding between atoms; Chemical reaction make or break chemical bonds, Water and life The water molecule is polar; Properties of water;Ionization of water | Class test |
| January 2022 | Organic chemistry-the study of carbon compounds; Properties of organic compounds, Structure and function of biomolecule. Carbohydrates act as fuel and building materials; Lipids are group of hydrophobic molecules; Protein have diverse structures and functions; Nucleic acids store and transmit hereditary information | Group Discussion and Doubt clearing sessions |
| February 2022 | Examination |  |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Sanjeela Punia

Class – B.Sc Medical IIIrd Semester

Subject- Botany

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | General characters, origin and evolution of Gymnosperms, Geological Time Table, Evolution of Seed Habit, Pilger and Melchior’s (1954) system of classification of Gymnosperms.  Tissues - meristematic and permanent (simple, complex and secretory) Tissue systems (Epidermal, ground and vascular) The Shoot system - shoot apical meristem and its histological organizations. | Class test on the topics taught |
| October 2021 | Palaeobotany- Fossils and Fossilization (Process involved, types of fossils and importance of fossils); Reconstruction of the following fossil plants: Lyginopteris Williamsonia Cycadeoidea (= Bennettites)  Cambium - structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm; Anomalous secondary growth (Dracaena, Boerhaavia and Achyranthes) | Assignment on the Fossils and Fossilization |
| November 2021 | Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of following plants: Cycas Pinus  Leaf: Types of leaves (simple and compound); phyllotaxy. Epidermis-uniseriate and ultiseriate, epidermal appendages and their morphological types. Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves, leaf abscission, Stomatal apparatus and their morphological types | Assignment on Monocot and dicot leaf |
| December 2021 | Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of Ephedra  Root system: Root apical meristem; histological organization Secondary growth in dicot root. | Test on the Ephedra |
| January 2022 | Economic importance of Gymnosperms General characters, origin and evolution of Angiosperms  Structural modifications in roots: Storage (Beta), Respiratory (Rhizophora), Epiphytic (Vanda) | Group discussion on the structural modifications, and doubt clearing sessions |

**Lesson Plan (2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Sanjeela Punia

Class – B.Sc Botany (Hons.) 5th Semester

Subject- Genetics and Genomics I

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Mendel’s work on transmission of traits, Genetic Variation, Molecular basis of Genetic Information, Interrelation between the cell structure and the genetics function, Mitosis, Meiosis (explaining Mendel’s ratios), | Class Test Mendelian genetics |
| October 2021 | Principles of Inheritance, Chromosome theory of inheritance, Laws of Probability, Pedigree analysis Incomplete and codominance, Multiple alleles, Lethal alleles, Epistasis, Pleiotropy, Environmental effects on phenotypic expression, sex linked inheritance. | Assignments on Pedigree analysis and Epistasis |
| November 2021 | Linkage and crossing over, Cytological basis of crossing over, Molecular mechanism of crossing over, Recombination frequency as a measure of linkage intensity, two factor and three factor crosses, Interference and coincidence, Somatic cell genetics – an alternative approach to gene mapping. | Class test on Linkage and crossing over |
| December 2021 | Chromosomal Mutations, Gene mutations, Molecular basis of Mutations in relation to UV light and chemical mutagens, Detection of mutations: CLB method, Attached X method, DNA repair mechanisms, Sex Determination, Environmental factors determining sex determination, Barr bodies, Dosage compensation. | Discussion on Mutations and its various positive and negative effects. |
| January 2022 | Extrachromosomal Inheritance :Chloroplast mutation/Variegation in Four o’ clock plant and Chlymodomonas, Mitochondrial mutations in Neurospora and yeast, Maternal effects, Infective heredity- Kappa particles in Paramecium, Quantitative and multifactor inheritance, transgressive variations, Heterosis. | Doubt Clearing sessions and revision |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Bhupendra**

**Class – Botany hons. 3rd sem.**

**Subject- cell biology-1 (BOT301)**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | On CCL |  |
| November 2021 | Overview of prokaryotic and eukaryotic cells, cell size and shape, Phages, Viriods, Mycoplasma and Escherichia coli. Microscopy: Principles of Light microscopy; Phase contrast microscopy; Confocal microscopy; Electron microscopy (EM)- scanning EM and scanning transmission EM (STEM); Fluorescence microscopy;Flow cytometry- flurochromes, fluorescent probe and working principle; Spectrophotometry; Mass spectrometry; X-ray diffraction analysis. Separation-Sub-cellular fractionation- differential and density gradient centrifugation; Chromatography- paper, thin-layer, gel-filtration, ion-exchange, affinity and High- Performance Liquid Chromatography (HPLC) | Class test 1 |
| December 2021 | Composition of Cells: Molecules of cell, cell membranes and cell Proteins. The Nucleus :Nuclear Envelope- structure of nuclear pore complex, nuclear lamina, Transport across Nuclear Envelope, Chromatin: molecular organization, Nucleolus and rRNA Processing. Protein Sorting and Transport The Endoplasmic reticulum, The Golgi Apparatus, Mechanism of Vesicular Transport, Lysosomes. | Assignment on chromatography. |
| January 2022 | Mitochondria, Chloroplasts and Peroxisomes Structural organization, Function, Marker enzymes,Mitochondrial biogenesis, Protein import in mitochondria, Semiautonomous nature of mitochondria and chloroplast, chloroplast DNA, Peroxisomes’assembly, Cytoskelton and Cell Movement ,Structure and organization of actin filaments; actin, myosin and cell movement; intermediate filaments; microtubules | Assignment on cytoskeleton.  Class test 2 |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Bhupendra**

**Class – Botany hons. 3rd Sem**

**Subject- Plant Resource Utilization**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | On CCL |  |
| November 2021 | Origin of Cultivated Plants Concept of centres of origin, their importance with reference to Vavilov’s work; examples of major plant introductions; Crop domestication and loss of genetic diversity; evolution of new crops/varieties, importance of germplasm diversty.Cereals Wheat and Rice, Role of dwarf varieties in green revolution; brief account of millets and Pseudocereals.Legumes: General account, importance to man and ecosystem; chief pulses grown in India. Fruits :Mango, Citrus, Papaya. Sugars and starches: Ratooning and nobilization of sugarcane, products and by products of sugarcane industry; Potato (Tuber anatomy and propagation methods) and comparative account with cassava. | Class test1 |
| December 2021 | Spices Listing of important spices, their family and part used; with special reference to fennel, saffron, clove, turmeric and all spices; common adulterants of spices. Beverages: Tea, coffee and cocoa, their processing and some common adulterants. Oils and Fats: General description with details of groundnut, coconut, linseed and Brassica spp and their use related health implications. Essential Oils: General account and comparison with fatty oils. Natural Rubber Para Rubber, tapping and processing, Various substitutes of Para Rubber. | Class test 2 |
| January 2022 | Drug Yielding Plants Therapeutic and habit forming drugs with special reference to Cinchona, Digitalis, Rauvolfia, Papaver and Cannabis.Masticatories and Fumitories Tobacco and Health hazards. Timber plants General account with special reference to teak and pine.Fibres: Classification based on the origin of fibres, Tetraploid cotton and Jute. | Assignment on drug yielding plants. |
| February 2022 | Examination |  |
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**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Dr. Shweta Pandey

Class – B.Sc Botany (Hons.) 3rd Semester

Subject- MOLECULAR BIOLOGY-I

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Nucleic Acids convey Genetic Information: DNA as the carrier of genetic information, Key experiments establishing-The Central Dogma, DNA Double helix, Genetic code, Direction of Protein Synthesis. The Structures of DNA and RNA / Genetic Material DNA Structure: Miescher to Watson and Crick- historic perspective, DNA structure, Salient features of double helix, Types of DNA, Types of genetic material, DNA topology - linking number, topoisomerases; RNA Structure, Organelle DNA -- mitochondria and chloroplast DNA. | Class test 1 |
| October 2021 | Genome Structure, Chromatin and the Nucleosome: Organization of genome in Prokaryotes, Viruses, Eukaryotes. Genome Sequence and Chromosome Diversity, Chromosome Duplication and Segregation, The Nucleosome Chromatin structure- Euchromatin, Heterochromatin- Constitutive and Facultative heterochromatin. Regulation of Chromatin Structure and Nucleosome Assembly. Special chromosomes: polytene and lampbrush chromosomes. | Assignment |
| November 2021 | The Replication of DNA (Prokaryotes and Eukaryotes) Chemistry of DNA synthesis, general principles - bidirectional replication, Semi- conservative, Semi discontinuous, RNA priming, Various models of DNA replication including rolling circle, D-loop (mitochondrial), (theta) mode of replication, replication of linear ds-DNA, replicating the 5’end of linear chromosome. | Class Test 2 |
| December 2021 | Enzyme involved in DNA replication – DNA polymerases, DNA ligase, Primase, Telomerase and other accessory proteins. The Mutability and Repair of DNA Replication Errors, DNA Damage and their repair | Assignment 2 |
| January 2022 | DNA denaturation and renaturation, cot curves, molecular mechanism of recombination, Genomics and Revision | Class Test 3 |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Dr. Shweta Pandey**

**Class – BSc Medical Ist Sem**

**Subject- Diversity of microbes**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | **Bacteria:** Structure, nutrition, reproduction and economic importance **Cyanobacteria**: General characters; life-history of *Nostoc* **Algae:** General characters, classification (upto classes) and economic importance; General account of algal blooms | Assignment 1 |
| November 2021 | Important features and life-history (excluding development) of *Volvox*, *Oedogonium* (Chlorophyceae), *Vaucheria* (Xanthophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae) | Assignment 2 |
| December 2021 | **Viruses:** General account of Viruses including structure of TMV and Bacteriophages  **Fungi:** General characters, classification (upto classes) and economic importance;  General account of Lichens | Test 1 |
| January 2022 | Important features and life-history of *Phytophthora* (Mastigomycotina), *Mucor*  (Zygomycotina), *Penicillium* (Ascomycotina), *Puccinia*, *Agaricus* (Basidiomycotina),  *Colletotrichum* (Deuteromycotina) | Test 2 |
| February 2022 | Examination |  |

**Lesson Plan(2021-22 /Odd Semester)**

**Name of the Teacher-Amita Kumari**

**Class –B.Sc. Pass Course Medical 5th sem**

**Subject-Plant Physiology(5.1)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Plant water relations, physical properties of water, Imbibition. Diffusion and osmosis, absorption of water.  transport of water ,Transpiration and Physiology of stomata. Introduction to mineral nutrition. |  |
| October 2021 | Mineral nutrition, essential micronutrients and macronutrients, and their role, uptake of mineral nutrients.  deficiency symptoms of mineral nutrition, transport of organic substances, mechanism of phloem transport.  source sink relationship, factors affecting translocation.  Photosynthesis, historical aspects and its significance, absorption spectra and action spectra. | Test |
| November 2021 | various photosynthetic pigments, two phases of photosynthesis, enhancement effects, hill reaction and oxidents. concept of two photosystems, photolysis of water, Z- scheme, cyclic electron transport system  Photophosphorylation, dark reaction, Calvin cycle. C4 pathway.CAM plants and CAM pathway, Photorespiration. |  |
| December 2021 | growth and development, Definitions and phases of growth.  Phases of development and seed dormancy.  Plant movements and concept of photoperiodism.  concept of flowering and its physiology.  florigen concept and senescence  Physiology of senescence and concept of fruit ripening | Test |
| January 2022 | introduction to plant hormones , auxin –discovery of auxin hormone, mechanism of action and its physiological effects.  Gibberllins and cytokinins, their discovery, mechanism of action and physiological effects.  Abscissic acid and ethylene, their discovery, mechanism of action and physiological effects.  concept of Photomorphogenesis  Phytochrome , their discovery and physiological role.  mechanism of action of phytochrome , Introduction to cryptochrome. | Assignment |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher-Amita Kumari**

**Class – B.Sc. Pass Course Medical 5th sem**

**Subject- Ecology (5.2)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Introduction to ecology , definition and its scope.  importance of ecology and its level of organization.  introduction to environment and environmental factors. climatic factors [water, humidity, wind, light, temperature] | Test |
| October 2021 | Edaphic factors [soil profile, its formation, physico-chemical properties of soil]  topographic and biotic factors[ species interaction  Adaptations of plants to water stress and salinity.  morphological and anatomical features of hydrophytes and xerophytes. |  |
| November 2021 | morphological and anatomical features of halophytes and introduction to population ecology.  characteristics of population ecology, biotic potential. growth curves , ecotypes and ecads.  concept of community ecology, qualitative characteristics of community ecology,  quantitative and analytical characteristics of community ecology | Test |
| December 2021 | synthetic characteristics of community ecology, method of analysis.Ecological succession  introduction to ecosystem  structural components of ecosystem  functions of ecosystem like trophic levels, food chain, food web. ecological pyramids and energy flow. Biogeochemical cycle.carbon, nitrogen, phosphorus cyclehydrological cycle |  |
| January 2022 | introduction to phytogeography.  phytogeographical regions of India. vegetation types of India. environmental pollution, types, sources and control of air and water pollution. green house effect and green house gases, impacts of global warming, carbon tradingozone layer depletion and biomagnification. | Assignment |
| February 2022 | Examination |  |
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**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Amita Kumari**

**Class – Botany hons. 5th sem.**

**Subject- Ecology -Ⅱ (BOT-505)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Introduction to community, analytical characteristics of community. Synthetic characteristics of community, Ecotone and edge effect. method of studying vegetation, dynamics of communities. plant succession : processes, types , primary and secondary succession | Test |
| October 2021 | concepts of climax, structure of ecosystem.biotic and abiotic components in ecosystem, processes in ecosystem  trophic organization, basic source of energy, autotrophy and heterotrophy parasitism, food chains, food webs, ecological pyramids  biomass, standing crop, functional aspects of ecosystem energy flow and its principles | Test |
| November 2021 | grazing and detritus food chains, models of energy flow. ecosystem productivity, measurements of ecosystem productivity  ecological efficiencies and concept of energy subsidy, biogeochemical cycle | Assignment |
| December 2021 | dynamics of biogeochemical cycle, hydrological cycle  gaseous cycles and sedimentary cycles.  aquatic ecosystem, fresh water (lotic and lentic) marine ecosystem (pelagic and benthic) estuarine ecosystem, introduction to biomes ,tundra biome, temperate biome | Assignment |
| January 2022 | tropical biome, introduction to phytogeography  principles of phytogeography, endemism  hotspots, phytogeographical divisions of India, vegetation of Delhi | Assignment |
| February 2022 | Examination |  |

**Lesson Plan( 2021-22 /Odd Semester)**

Name of the Teacher- Mrs. Archana Singh

Class – B.Sc Medical IIIrd Semester

Subject- Botany (Biology and Diversity of Seed Plants-I) and Plant Anatomy

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | General characters, origin and evolution of Gymnosperms, Geological Time Table, Evolution of Seed Habit, Pilger and Melchior’s (1954) system of classification of Gymnosperms.  Tissues - meristematic and permanent (simple, complex and secretory) Tissue systems (Epidermal, ground and vascular) The Shoot system - shoot apical meristem and its histological organizations. | Class test on the topics taught |
| October 2021 | Palaeobotany- Fossils and Fossilization (Process involved, types of fossils and importance of fossils); Reconstruction of the following fossil plants: Lyginopteris Williamsonia Cycadeoidea (= Bennettites)  Cambium - structure and functions. Secondary growth in dicot stem; characteristics of growth rings; sap wood and heart wood, periderm; Anomalous secondary growth (Dracaena, Boerhaavia and Achyranthes) | Assignment on the Fossils and Fossilization |
| November 2021 | Morphology and anatomy of root, stem, leaf/leaflet and reproductive parts including mode of reproduction, life-cycle and economic importance of following plants: Cycas Pinus  Leaf: Types of leaves (simple and compound); phyllotaxy. Epidermis-uniseriate and ultiseriate, epidermal appendages and their morphological types. Anatomy of typical Monocot and Dicot leaf and cell inclusions in leaves, leaf abscission, Stomatal apparatus and their morphological types | Assignment on Monocot and dicot leaf |
| December 2021 | On Maternity | - |

**Lesson Plan(2021-22 /Odd Semester)**

**Name of the Teacher-Dr. Archana Singh**

**Class –B.Sc. Zoology Hons 3rd sem**

**Subject-** **BOTANY III (PLANT ANATOMY, REPRODUCTION & BIOTECHNOLOGY)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Plant Anatomy: Classification and structure of tissues; Organization of root and shoot apex; basic structure of dicot and monocot leaf; secondary growth in roots and stems; Anatomical adaptations of hydrophytes and xerophytes; Anomalous secondary growth in Boerhaavia, Tecoma and Dracaena | Assignment |
| October 2021 | Applications of anatomy in systematics, forensics and pharmacognosy ,Plant reproduction: Structure of male and female gametophyte; mircrosporogenesis and megasporogenesis, Pollination and fertilization; pollen-pistil Interaction; self incompatibility and methods to overcome self incompatibility; | Test |
| November 2021 | endosperm types and functions; embryogenesis and polyembryony, Plant tissue culture: Historical perspective; composition of media; totipotency; physic-chemical conditions for propagation of plant cells and tissues; somatic embryogenesis; | Assignment |
| December 2021 | On Maternity Leave. | Assignment |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Nisha**

**Class – BSc Medical Ist Sem**

**Subject- Diversity of microbes**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | **Bacteria:** Structure, nutrition, reproduction and economic importance **Cyanobacteria**: General characters; life-history of *Nostoc* **Algae:** General characters, classification (upto classes) and economic importance; General account of algal blooms | Assignment 1 |
| November 2021 | Important features and life-history (excluding development) of *Volvox*, *Oedogonium* (Chlorophyceae), *Vaucheria* (Xanthophyceae), *Ectocarpus* (Phaeophyceae) and *Polysiphonia* (Rhodophyceae) | Assignment 2 |
| December 2021 | **Viruses:** General account of Viruses including structure of TMV and Bacteriophages  **Fungi:** General characters, classification (upto classes) and economic importance;  General account of Lichens | Test 1 |
| January 2022 | Important features and life-history of *Phytophthora* (Mastigomycotina), *Mucor*  (Zygomycotina), *Penicillium* (Ascomycotina), *Puccinia*, *Agaricus* (Basidiomycotina),  *Colletotrichum* (Deuteromycotina) | Test 2 |
| February 2022 | Examination |  |

**Lesson Plan (2021-22 /Odd Semester)**

**Name of the Teacher- Nisha**

**Class – BSc Medical Ist Sem**

**Subject- Cell biology**

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| Month | Topics to be covered | Assignments/Test |
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| October 2021 | **The Cell Envelopes**: Structure and functions of Cell Wall, Plasma Membrane,  Golgi Apparatus, Endoplasmic Reticulum, Lysosomes, Peroxisomes and Vacuoles | Assignment 1 |
| November 2021 | **Ultra-structure and function**: Chloroplast, Mitochondria, Nucleus and Nucleolus  **Chromosome**: Morphology, ultra-structure - kinetochore, centromere and telomere | Assignment 2 |
| December 2021 | **Cell Cycle:** General account  **Cell Division**: Mitosis and Meiosis - Stages and Significance | Test 1 |
| January 2022 | **Chromosomal aberrations**: Structural and Numerical - deletions, duplications,  translocations, inversions, aneuploidy, polyploidy  Sex chromosomes and Sex determination in Plants | Test 2 |
| February 2022 | Examination |  |
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**Name of the Teacher- Nisha**

**Class –B.Sc. Pass Course Medical 5th sem**

**Subject-Plant Physiology (5.1)**

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| Month | Topics to be covered | Assignments/Test |
| September 2021 | Plant water relations, physical properties of water, Imbibition. Diffusion and osmosis, absorption of water.  transport of water ,Transpiration and Physiology of stomata. Introduction to mineral nutrition. |  |
| October 2021 | Mineral nutrition, essential micronutrients and macronutrients, and their role, uptake of mineral nutrients.  deficiency symptoms of mineral nutrition, transport of organic substances, mechanism of phloem transport.  source sink relationship, factors affecting translocation.  Photosynthesis, historical aspects and its significance, absorption spectra and action spectra. | Test |
| November 2021 | various photosynthetic pigments, two phases of photosynthesis, enhancement effects, hill reaction and oxidents. concept of two photosystems, photolysis of water, Z- scheme, cyclic electron transport system  Photophosphorylation, dark reaction, Calvin cycle. C4 pathway.CAM plants and CAM pathway, Photorespiration. |  |
| December 2021 | growth and development, Definitions and phases of growth.  Phases of development and seed dormancy.  Plant movements and concept of photoperiodism.  concept of flowering and its physiology.  florigen concept and senescence  Physiology of senescence and concept of fruit ripening | Test |
| January 2022 | introduction to plant hormones , auxin –discovery of auxin hormone, mechanism of action and its physiological effects.  Gibberllins and cytokinins, their discovery, mechanism of action and physiological effects.  Abscissic acid and ethylene, their discovery, mechanism of action and physiological effects.  concept of Photomorphogenesis  Phytochrome , their discovery and physiological role.  mechanism of action of phytochrome , Introduction to cryptochrome. | Assignment |
| February 2022 | Examination |  |

**TEACHERWISE LESSON PLAN 2021-22/ EVEN SEMESTER**

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Archana Soota

Class – B.Sc Botany(Hons) 2nd semester

Subject- DIVERSITY OF GYMNOSPERMS

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Introduction to the Gymnosperms |  |
| April 2022 | General account of fossils, techniques used to study fossil. Evolution of gymnosperms. Classification and distribution of Gymnosperms in India. Contribution of Prof. Birbal Sahni. | Assignment on distribution of gymnosperm in INDIA |
| May 2022 | Characteristic features and life cycle patterns of Gymnosperms. Patterns of variation in morphology of gymnosperms,. Ecological and Economic importance of Gymnosperms.  Morphology and anatomy of Cycas, Pinus, Ephedra, Gnetum. Reproduction in Cycas, Pinus, Ephedra, Gnetum. | Class test on the topics covered in the class and Group discussion on ecological and economic importance of gymnosperm |
| June 2022 | Modern methods of propagation of gymnosperms: somatic embryogenesis, haploids and protoplast culture. | Class test on the topics covered in the class |
| 26th June 2022 | Examination |  |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Archana Soota

Class – B.Sc Botany (Hons.) 2nd Semester

Subject- DIVERSITY OF BRYOPHYTES AND PTERIDOPHYTES

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Introduction to Bryophytes | - |
| April 2022 | Characteristic features and life cycle patterns of Bryophytes. Classification; Habit and Habitat; Adaptations to land habit. Evolution of sporophyte. Ecological and Economic importance of Bryophytes. | Assignment on ecological and economic importance of bryophytes |
| May 2022 | Comparative account of Morphology and Anatomy of Riccia, Marchantia, Pellia, Porella, Anthoceros, Sphagnum and Funaria; Reproduction and evolutionary trends in Riccia, Marchantia, Anthoceros and Funaria (developmental stages not included).  Characteristic features and life cycle patterns of Pteridophytes. Evolutionary concepts in Pteridophytes: Telome theory; Stelar evolution; Heterospory and seed habit Apogamy and Apospory.Ecological and Economic importance of Pteridophytes. | Class Test |
| June 2022 | Comparative account of Morphology and Anatomy of Rhynia, Psilotum, Selaginella, Equisetum, Pteris, Marsilea; Reproduction and evolutionary trends in Selaginella; Equisetum; and Pteris. | Group Discussion on Evolutionary trends and doubt clearing sessions |
|  | Examination |  |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Anita Rathee

Class – BSc Medical 2nd Sem

Subject- Diversity of Archegoniates

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | **Bryophyta-** General characters, classification (upto classes), alternation of generations,  evolution of sporophytes and economic importance | Assignment 1 |
| April 2022 | **Bryophyta**: Structure and reproduction (excluding development) of *Marchantia*  (Hepaticopsida), *Anthoceros* (Anthocerotopsida) and *Funaria* (Bryopsida) | Assignment 2 |
| May 2022 | **Pteridophyta-** General characters, classification (upto classes), alternation of  generations, heterospory, apospory, apogamy and economic importance;  General account of stellar evolution | Test 1 |
| June 2022 | **Pteridophyta**: Structure and reproduction (excluding development) of *Rhynia*  (Psilopsida), *Selaginella* (Lycopsida), *Equisetum* (Sphenopsida) and *Pteris* (Pteropsida) | Test 2 |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Mrs. Anita Rathee**

**Class – BSc Medical 2nd Sem**

**Subject- Genetics**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | **Genetic Material:** DNA - the genetic material, DNA structure and replication, DNA-  Protein interaction, The Nucleosome Model, Genetic Code, Satellite and Repetitive  DNA. | Assignment 1 |
| April 2022 | **Genetic Inheritance:** Mendelism: Laws of Segregation and Independent Assortment;  Linkage Analysis; Allelic and non-allelic interactions. | Assignment 2 |
| May 2022 | **Extra-nuclear Inheritance:** Presence and function of Mitochondrial and Plastid DNA;  Plasmids. **Genetic Variations:** Mutations - spontaneous and induced; transposable genetic  elements; DNA damage and repair | Test 1 |
| June 2022 | **Gene Expression:** Modern concept of gene; RNA; Ribosomes; Transfer of genetic  information - transcription and translation; Structure of proteins; Regulation of gene  expression in prokaryotes and eukaryotes | Test 2 |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher-Mrs. Anita Rathee

Class – B.Sc. Pass Course Medical 6th sem

Subject- Economic Botany (6.2)

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | N.I. Vavilov and his centres of origin of crop plants and basic knowledge of Origin, distribution, botanical description, brief idea of cultivation and economic uses of cereals like rice, wheat and maize.Origin, distribution,botanical description, brief idea of cultivation and economic uses of pulses ( gram, arhar and pea), vegetables ( potato, tomato and onion). |  |
| April 2022 | Origin, distribution, botanical description, brief idea of cultivation and economic uses of Fibers- cotton, jute and flax. Origin, distribution, botanical description , brief idea of cultivation and economic uses of Oils- groundnut, mustard, sunflower and coconut. | Test |
| May 2022 | Origin, distribution, botanical description, brief idea of cultivation and economic uses of Fibers- cotton, jute and flax.Origin, distribution, botanical description , brief idea of cultivation and economic uses of Oils- groundnut, mustard, sunflower and coconut. | Assignment |
| June 2022 | Beverages- tea and coffee, also know about Rubber plant - *Hevea*;  Botanical description, processing and uses of sugarcane plant.Also have general knowledge and sources of timber; energy plantations and bio-fuels. |  |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Dr. Anjana Anand

Class – B.Sc. Botany Hons. 6th sem.

Subject- Reproductive Biology of Angiosperms, BOT 602

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | History and scope, **Anther:** Structure, ontogeny; tapetum; structure and functions;  micro-sporogenesis; callose deposition and its significance**,** Microgametogenesis, pollen wall development, MGU (male germ unit) structure, NPC system, pollen wall proteins; pollen viability,  storage and germination; pollen tube structure. | Test on the topics taught |
| April 2022 | **Ovule:** Structure, ontogeny, types; special structures – endothelium, operculum, obturator, aril,  arillode, caruncle, hypostase, epistase: female gametophyte –megasporogenesis and  megagametogenesis: organization and ultra structure of mature embryo sac. | Test |
| May 2022 | **Pollination and Fertilization:** Pollination types and significance; adaptations; pollination biology;pollen-pistil Interaction; structure of stigma and style; double fertilization. **Self Incompatibility:**Basic concepts; methods to overcome self incompatibility. | Test |
| June 2022 | Types, development and functions; endosperm haustoria. **Embryogenesis:**  Classification, development, organization and differentiation of crucifer and Najas embryo; embryo–  endosperm relationship; physiological and genetical control. **Polyembryony and Apomixes:**Introduction; classification; causes and applications. | Test and assignment  Revision of topics  Class Presentation by students |
| 26th June 2022 | Examination |  |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher-Dr. Anjana Anand

Class –B.Sc. Botany Hons 6th sem.

Subject-Plant Biotechnology, BOT603

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | **Plant Tissue Culture :**Historical perspective; composition of media; nutrient and hormone  requirement; totipotency; Organization; physic-chemical conditions for propagation of plant cells and  tissues; somatic embryogenesis; protoplast isolation culture and fusion; cybrids micropropagation;  androgenesis. Tissue Culture Applications. Pest resistant plants (Bt-cotton); herbicide resistance; disease and stress resistant plants. | Test on the topics taught |
| April 2022 | **Tools and Techniques of Genetic Engineering :**Restriction Endonucleases (history, types and role);  Gel Electrophoresis; PCR; Restriction Mapping; DNA Sequencing (Sanger’s method); Southern,  Northern and Western blotting; construction of genomic library; DNA Fingerprinting (RAPD,  RFLP); FISH. Role of transgenics in degradation of pollutants (Superbug) leaching out of minerals | Test |
| May 2022 | **Plant Transformation Technology:** Obtaining gene of interest by different methods; Gene  constructs; Gene transfer – prokaryotic and eukaryotic vectors; *Agrobacterium*-mediated  transformation; Direct gene transfer methods– Electroporation, Microinjection, Gene-gun; Selection  of transgenic - marker and reporter genes. transgenic  crops with improved quality traits (Flavr savr tomatoes, Golden rice) | Test |
| June 2022 | Application of plant biotechnology for  production of quality oil, industrial enzymes, edible vaccines and plantibodies. | Test and assignment  Revision of topics  Class Presentation by students |
| 26th June 2022 | Examination | Revision |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Sanjeela Punia

Class – B.Sc medical IVth Semester

Subject- Botany

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Taxonomy and Systematics, fundamental components of taxonomy. |  |
| April 2022 | Role of chemotaxonomy, cytotaxonomy and taximetrics in relation to taxonomy, Botanical Nomenclature, principles and rules, principle of priority, Keys to identification of plants.Type concept, taxonomic ranks, Salient features of the systems of classification of angiosperms proposed by Bentham & Hooker and Engler & Prantl, Floral Terms and Types of Inflorescence.  Flower-a modified shoot, Microsporangium, its wall and dehiscence mechanism. Microsporogenesis, pollen grains and its structure (pollen wall).  Pollen germination (microgametogenesis), Male gametophyte, Pollen-pistil interaction, self-incompatibility, Pollination-its types and agencies. | Test on the different system of classification. Group discussion on Flower as a modified shoot. |
| May 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the following families: Ranunculaceae, Brassicaceae, Malvaceae, Euphorbiaceae, Rutaceae, Fabaceae, Cucurbitaceae  Structure of Megasporangium (ovule), its curvatures; Megasporogenesis and Megagametogenesis,Female gametophyte (mono, bi and tetrasporic), Double fertilization,Endosperm types and its biological importance. | Assignment on the economic importance of the families describes in the class. Test on types of megasporangium |
| June 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the families: Apiaceae, Asclepiadaceae, Lamiaceae, Solanaceae, Asteraceae, Liliaceae and Poaceae  Embryogenesis in Dicot and Monocot; Polyembryony, Structure of Dicot and Monocot seed, Fruit types; Dispersal mechanisms in fruits and seeds. | Assignment on the economic importance of the families describes in the class. Test on Embryogenesis. Doubt clearing sessions |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Sanjeela Punia

Class – B.Sc Botany(Hons.) 6th Semester

Subject- Genetics and Genomics II

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Recombination in bacteria |  |
| April 2022 | Transposable genetic elements in Prokaryotes and Eukaryotes. Eukaryotic Viruses. Study of model systems in developmental genetics-Drosophila melanogaster, Sachharomyces cerevisiae, Caenorhabditis elegans, Arabidopsis thaliana, and Xenopus laevis. Introduction to Bioinformatics, Gene and protein databases; Sequence similarity and alignment; Gene feature identification. Gene Annotation and analysis of transcription and translation; Post translational analysis, Protein interaction. | Test and Discussion on Various types of Transposable elements and its advantages.  Presentations by the students group on the various topics given. |
| May 2022 | Genomes of bacteria, Drosophila and Humans; Human genome project; Evolution and Comparative Genomics. Genomic Analysis, functional genomics and system biology. | Presentations by the students group on the various topics given and group discussions. |
| June 2022 | Allele frequencies, Genotype frequencies, Hardy-Weinberg Law, Evolutionary Genetic. | Class test on speciation and role of evolution. Revision and doubt clearing session. |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Rakhi Kaushik

Class – B.Sc Botany (hons.) 2nd Semester

Subject- PLANT DEVELOPMENT AND ANATOMY

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Plant sporophyte- A bipolar structure; Onset of polarity |  |
| April 2022 | Plant Sporophyte- Cytodifferentiation and organogenesis during embryonic development; physiological and genetic aspects.  Introduction and scope of Plant Anatomy: Applications in systematics, forensics and pharmacognosy.  Tissues and Cell Walls: Classification and structure of tissues; cytodifferentiation of tracheary elements and sieve elements; pits and plasmodesmata; wall ingrowths and transfer cells; adcrustation and incrustation; ergastic substances. |  |
| May 2022 | Leaf: Development of leaf, histology of C3 and C4 leaves; stomatal complex and diversity of stomata, scale leaves.  Stem: Organization of shoot apex (apical cell theory, histogen theory, tunica corpus theory, plastochrone); shoot chimeras; types of vascular bundles; primary phloem and primary xylem; terminal, lateral and adventitious buds; primary thickening meristem.  Root: Organization of root apex (apical cell theory, histogen theory, korper-kappe theory); quiescent centre; root cap; primary root tissue: rhizodermis, cortex, endodermis, exodermis, metacutinization, lateral root apices; secondary growth in roots. |  |
| June 2022 | Vascular Cambium Structure and function; concept of cambial zone; cambial derivatives; seasonal activity of cambium and unusual cambial activity. Secondary Growth: Axially and radially oriented xylary and phloic elements, cyclic aspects, juvenile adult and reaction woods; sap wood and heart wood; Phloem as a dynamic tissue. Periderm: Development and composition of periderm, rhytidome and lenticels.  Epidermal tissue system; Anatomical adaptations in stems, leaves and roots of xerophytes, hydrophytes and halophytes. Secretory and Excretory System Hydathodes, salt glands, nectaries; cavities, lithocysts and laticifers. |  |
| 26th June 2022 | Examination |  |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Rakhi kaushik

Class – B.Sc medical IVth Semester

Subject- Botany

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Taxonomy and Systematics, fundamental components of taxonomy. |  |
| April 2022 | Role of chemotaxonomy, cytotaxonomy and taximetrics in relation to taxonomy, Botanical Nomenclature, principles and rules, principle of priority, Keys to identification of plants.Type concept, taxonomic ranks, Salient features of the systems of classification of angiosperms proposed by Bentham & Hooker and Engler & Prantl, Floral Terms and Types of Inflorescence.  Flower-a modified shoot, Microsporangium, its wall and dehiscence mechanism. Microsporogenesis, pollen grains and its structure (pollen wall).  Pollen germination (microgametogenesis), Male gametophyte, Pollen-pistil interaction, self-incompatibility, Pollination-its types and agencies. | Test on the different system of classification. Group discussion on Flower as a modified shoot. |
| May 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the following families: Ranunculaceae, Brassicaceae, Malvaceae, Euphorbiaceae, Rutaceae, Fabaceae, Cucurbitaceae  Structure of Megasporangium (ovule), its curvatures; Megasporogenesis and Megagametogenesis,Female gametophyte (mono, bi and tetrasporic), Double fertilization,Endosperm types and its biological importance. | Assignment on the economic importance of the families describes in the class. Test on types of megasporangium |
| June 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the families: Apiaceae, Asclepiadaceae, Lamiaceae, Solanaceae, Asteraceae, Liliaceae and Poaceae  Embryogenesis in Dicot and Monocot; Polyembryony, Structure of Dicot and Monocot seed, Fruit types; Dispersal mechanisms in fruits and seeds. | Assignment on the economic importance of the families describes in the class. Test on Embryogenesis. Doubt clearing sessions |

**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Mrs. Archana singh

Class – B.Sc medical IVth Semester

Subject- Botany

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | Taxonomy and Systematics, fundamental components of taxonomy. |  |
| April 2022 | Role of chemotaxonomy, cytotaxonomy and taximetrics in relation to taxonomy, Botanical Nomenclature, principles and rules, principle of priority, Keys to identification of plants.Type concept, taxonomic ranks, Salient features of the systems of classification of angiosperms proposed by Bentham & Hooker and Engler & Prantl, Floral Terms and Types of Inflorescence.  Flower-a modified shoot, Microsporangium, its wall and dehiscence mechanism. Microsporogenesis, pollen grains and its structure (pollen wall).  Pollen germination (microgametogenesis), Male gametophyte, Pollen-pistil interaction, self-incompatibility, Pollination-its types and agencies. | Test on the different system of classification. Group discussion on Flower as a modified shoot. |
| May 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the following families: Ranunculaceae, Brassicaceae, Malvaceae, Euphorbiaceae, Rutaceae, Fabaceae, Cucurbitaceae  Structure of Megasporangium (ovule), its curvatures; Megasporogenesis and Megagametogenesis,Female gametophyte (mono, bi and tetrasporic), Double fertilization,Endosperm types and its biological importance. | Assignment on the economic importance of the families describes in the class. Test on types of megasporangium |
| June 2022 | Diversity of Flowering Plants: Diagnostic features and economic importance of the families: Apiaceae, Asclepiadaceae, Lamiaceae, Solanaceae, Asteraceae, Liliaceae and Poaceae  Embryogenesis in Dicot and Monocot; Polyembryony, Structure of Dicot and Monocot seed, Fruit types; Dispersal mechanisms in fruits and seeds. | Assignment on the economic importance of the families describes in the class. Test on Embryogenesis. Doubt clearing sessions |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher -Bhupendra**

**Class – Botany hons. 4th sem**

**Subject- Cell Biology-2 (BOT 401)**

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| Month | Topics to be covered | Assignments/Test |
| March 2022 | The Plasma Membrane Structure; Transport of small molecules, Endocytosis Cell Wall, the Extracellular Matrix and Cell Interactions Bacterial and Eukaryotic Cell Wall; the extracellular matrix and cell matrix interactions; cell-cell interactions. | Assignment on extracellular matrix. |
| April 2022 | Cell Signaling, Signaling molecules and their receptor; functions of cell surface receptors; Intracellular signal transduction pathway; signaling networks. The Cell Cycle ; Eukaryotic Cell Cycle, Regulation of Cell cycle progression, Events of Mitotic Phase, Meiosis and Fertilization. | Class test of unit 1. |
| May 2022 | . Cell Death and Cell Renewal Programmed Cell Death, Stem Cells and Maintenance of adult tissues, Embryonic Stem Cells and Therapeutic cloning. | Assignment on cell cycle regulation. |
| June 2022 | Unit 4. Cancer Development and Causes of Cancer, Tumor Viruses, Oncogenes, Tumor Suppressor genes, Cancer Treatment- molecular approach. | Class test of unit 3 |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Bhupendra

Class – Botany hons. 4th Sem

Subject- Molecular Biology-2 (BOT 402)

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | Mechanism of Transcription RNA Polymerase and the transcription unit Transcription in Prokaryotes Transcription in Eukaryotes RNA Modifications:Split genes, concept of introns and exons, removal of Introns, spliceosome machinery, splicing pathways, alternative splicing, exon shuffling, RNA editing, and mRNA transport. | Class test 1 |
| April 2022 | Translation (Prokaryotes and Eukaryotes Assembly line of polypeptide synthesis - ribosome structure and assembly, various steps in protein synthesis. Charging of tRNA, aminoacyl tRNA synthetases. Proteins involved in initiation, elongation and termination of polypeptides. Fidelity of translation. Inhibitors of protein synthesis. Regulation of translation Translation-dependent regulation of mRNA and Protein Stability. | Class test 2 |
| May 2022 | Unit3. Transcription Regulation in Prokaryotes Principles of transcriptional regulation, regulation at initiation with examples from lac and trp operonsRegulatory RNAs :Riboswitches, RNA interference, miRNA, siRNA, Regulatory RNA and X-inactivation Unit 4. | Assignment on transcription in prokaryotes. |
| June 2022 | Unit 4. Transcription Regulation in Eukaryotes Conserved mechanism of regulation, Eukaryotic activators, Signal integration, combinatorial control, transcriptional repressors, signal transduction and control of transcriptional regulator, Gene Silencing PRACTICALS | Class test of unit 4 |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Bhupendra**

**Class – Botany hons. 4th Sem**

**Subject- Molecular Biology-2 (BOT 402)**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | Enzymes :Historical background, classification, nomenclature and importance of enzymes; role of enzymes as catalysts; physiochemical and biological properties; concept of holoenzymes; coenzyme; apoenzyme and prosthetic groups; mechanism and kinetics of enzyme action; enzyme inhibitors; isoenzymes; allosteric enzymes; industrial aspects of enzymology. | Class test 1 |
| April 2022 | Carbon Assimilation: Role of chlorophylls and accessory pigments; antennae molecules and active center molecules; evidences for two photosystems; reduction of NADP; photophosphorylation; reduction of CO2 into glucose; Benson and Calvin cycle; Hatch and Slack pathway; Crassulacean acid metabolism; energetics of CO2 reduction; factors affecting CO2 reduction. , Carbon Oxidation: Glycolysis, anaerobic conversion of pyruvate into ethanol or lactate, energy balance, reversibility and inhibition of glycolysis, Pasteur effect, oxidative decarboxylation of pyruvate into acetyl CoA, TCA cycle, oxidative phosphorylation, oxidation of RuBP (photorespiration), factors affecting oxidative processes, regulation of TCA cycle, role of glyoxalate cycle | Class test 2 |
| May 2022 | Carbohydrate Metabolism: Structure, properties and importance of mono-, di- and polysaccharides; Synthesis of di - (sucrose) and polysaccharides (starch and cellulose). Nitrogen and Protein Metabolism:Biological nitrogen fixation and nitrogen cycle, Catabolism of amino acids, ammonia assimilation, transamination, deanimation, structure and general properties of amino acids and proteins (protein folding). Lipid Metabolism: Structure, properties, classification and functional significance of fatty acids, triglycerides and steroids; Synthesis and breakdown, formation of glycerides; oxidation of fatty acids, beta oxidation; energy balance. |  |
| June 2022 | Intermediary Metabolism: Interrelationship of carbohydrates, lipids and protein metabolism.) Regulation of Metabolism-Nature of integrated metabolism, role of acetyl CoA, control at the level of transcription and Translation, control of enzyme action. Secondary Metabolites and Plant Defense-Introduction to alkaloids, phenolics, plant terpenes, phytoalexins, sesquiterpenes and sterols. | Assignment on plant secondary metabolites. |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Dr. Shweta Pandey**

**Class – BSc Medical 2nd Sem**

**Subject- Diversity of Archegoniates**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | **Bryophyta-** General characters, classification (upto classes), alternation of generations,  evolution of sporophytes and economic importance | Assignment 1 |
| April 2022 | **Bryophyta**: Structure and reproduction (excluding development) of *Marchantia*  (Hepaticopsida), *Anthoceros* (Anthocerotopsida) and *Funaria* (Bryopsida) | Assignment 2 |
| May 2022 | **Pteridophyta-** General characters, classification (upto classes), alternation of  generations, heterospory, apospory, apogamy and economic importance;  General account of stellar evolution | Test 1 |
| June 2022 | **Pteridophyta**: Structure and reproduction (excluding development) of *Rhynia*  (Psilopsida), *Selaginella* (Lycopsida), *Equisetum* (Sphenopsida) and *Pteris* (Pteropsida) | Test 2 |

**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Dr. Shweta Pandey**

**Class – BSc Medical 2nd Sem**

**Subject- Genetics**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | **Genetic Material:** DNA - the genetic material, DNA structure and replication, DNA-  Protein interaction, The Nucleosome Model, Genetic Code, Satellite and Repetitive  DNA. | Assignment 1 |
| April 2022 | **Genetic Inheritance:** Mendelism: Laws of Segregation and Independent Assortment;  Linkage Analysis; Allelic and non-allelic interactions. | Assignment 2 |
| May 2022 | **Extra-nuclear Inheritance:** Presence and function of Mitochondrial and Plastid DNA;  Plasmids. **Genetic Variations:** Mutations - spontaneous and induced; transposable genetic  elements; DNA damage and repair | Test 1 |
| June 2022 | **Gene Expression:** Modern concept of gene; RNA; Ribosomes; Transfer of genetic  information - transcription and translation; Structure of proteins; Regulation of gene  expression in prokaryotes and eukaryotes | Test 2 |
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**Lesson Plan (2021-22 /Even Semester)**

Name of the Teacher- Dr. Shewta Pandey

Class – B.Sc Botany(Hons.) 4th semester

Subject- ECOLOGY I

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| Month | Topics to be covered | Assignments/Test |
| 31st March 2022 | - | - |
| April 2022 | Introduction to the Biosphere Inter-relationships between the living world and the environment, the components and dynamism, homeostasis. | Class Test 1 |
| May 2022 | Importance, origin, formation, composition; physical, chemical and biological components; soil profile; role of climate in soil development. Water: Importance; states of water in the environment; atmospheric moisture; precipitation types; water in soil, water table, water bodies: aquifers, water shed Unit 3: The Atmosphere Composition and stratification; radiation flux; role of electromagnetic radiations, UV, visible spectrum; variations in temperature; wind as a factor. The Living World:Biotic component of environment; types of biotic interactions. Fire:As an ecological factor. | Assignment 1 |
| June 2022 | Individual, population, community; concepts of autecology, synecology; concept of biological diversity; habitat and ecological niche. Population Ecology :Distribution and characteristics of population; population dynamics; Ecological Speciation | Class test 2 and assignment |
| 26th June 2022 | Examination |  |

**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher –Amita Kumari**

**Class – B.Sc. Pass Course Medical 6th sem**

**Subject- Biochemistry and Plant Biotechnology (6.1)**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and co-factors; regulation of enzyme activity;  mechanism of action. | Test |
| April 2022 | Respiration: ATP – the biological energy currency; aerobic and anaerobic respiration;  Krebs cycle; electron transport mechanism (chemiosmotic theory); redox -potential;  oxidative phosphorylation; pentose phosphate pathway. |  |
| May 2022 | Lipid metabolism: Structure and functions of lipids; fatty acid biosynthesis; β-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids. Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium assimilation. | Assignment |
| June 2022 | Genetic engineering and Biotechnology: Tools and techniques of recombinant DNA  technology; cloning vectors; genomic and cDNA library; transposable elements; aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis; biology of  *Agrobacterium*; vectors for gene delivery and marker genes. | Test |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher-Amita Kumari**

**Class – B.Sc. Pass Course Medical 6th sem**

**Subject- Economic Botany (6.2)**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | N.I. Vavilov and his centres of origin of crop plants and basic knowledge of Origin, distribution, botanical description, brief idea of cultivation and economic uses of cereals like rice, wheat and maize.Origin, distribution,botanical description, brief idea of cultivation and economic uses of pulses ( gram, arhar and pea), vegetables ( potato, tomato and onion). |  |
| April 2022 | Origin, distribution, botanical description, brief idea of cultivation and economic uses of Fibers- cotton, jute and flax. Origin, distribution, botanical description , brief idea of cultivation and economic uses of Oils- groundnut, mustard, sunflower and coconut. | Test |
| May 2022 | Origin, distribution, botanical description, brief idea of cultivation and economic uses of Fibers- cotton, jute and flax.Origin, distribution, botanical description , brief idea of cultivation and economic uses of Oils- groundnut, mustard, sunflower and coconut. | Assignment |
| June 2022 | Beverages- tea and coffee, also know about Rubber plant - *Hevea*;  Botanical description, processing and uses of sugarcane plant.Also have general knowledge and sources of timber; energy plantations and bio-fuels. |  |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Amita Kumari**

**Class – Botany hons. 6th Sem**

**Subject- Tools and Techniques (BOT-605)**

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| Month | Topics to be covered | Assignments/Test |
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| March 2022 | simple microscopy, phase contrast microscopy, florescence and electron microscopy and its type.  pH meter and its uses, absorption and emission spectroscopy technique. |  |
| April 2022 | Instruments, basic principles and usage of absorption fluorimetry, colorimetry, spectrophotometry (visible, UV, infra-red).  Instruments, basic principles and usage of Centrifugation, cell fractionation techniques, isolation of sub-cellular organelles | Test |
| May 2022 | Paper chromatography, thin layer chromatography, column chromatography: silica and gel filtration, affinity and ion exchange chromatography, gas chromatography, HPLC. electrophoresis techniques Starch-gel, polyacrylamide gel (native and SDS-PAGE), agrose-gel electrophoresis, immuno electrophoresis, isoelectric focusing, western blotting. |  |
| June 2022 | Different types of fermenters:principles operating characteristics of fermenters, air lift, continous stirred tank, fluidized and photofermenter  aeration and agitation system, antiform agents, pH, temperature and dissolved oxygen measurements and control, computer and automation | Assignment |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Nisha**

**Class – BSc Medical 2nd Sem**

**Subject- Diversity of Archegoniates**

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| Month | Topics to be covered | Assignments/Test |
|  |  |  |
| March 2022 | **Bryophyta-** General characters, classification (upto classes), alternation of generations,  evolution of sporophytes and economic importance | Assignment 1 |
| April 2022 | **Bryophyta**: Structure and reproduction (excluding development) of *Marchantia*  (Hepaticopsida), *Anthoceros* (Anthocerotopsida) and *Funaria* (Bryopsida) | Assignment 2 |
| May 2022 | **Pteridophyta-** General characters, classification (upto classes), alternation of  generations, heterospory, apospory, apogamy and economic importance;  General account of stellar evolution | Test 1 |
| June 2022 | **Pteridophyta**: Structure and reproduction (excluding development) of *Rhynia*  (Psilopsida), *Selaginella* (Lycopsida), *Equisetum* (Sphenopsida) and *Pteris* (Pteropsida) | Test 2 |
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**Lesson Plan (2021-22 /Even Semester)**

**Name of the Teacher- Nisha**

**Class – BSc Medical 2nd Sem**

**Subject- Genetics**

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| Month | Topics to be covered | Assignments/Test |
|  |  |  |
| March 2022 | **Genetic Material:** DNA - the genetic material, DNA structure and replication, DNA-  Protein interaction, The Nucleosome Model, Genetic Code, Satellite and Repetitive  DNA. | Assignment 1 |
| April 2022 | **Genetic Inheritance:** Mendelism: Laws of Segregation and Independent Assortment;  Linkage Analysis; Allelic and non-allelic interactions. | Assignment 2 |
| May 2022 | **Extra-nuclear Inheritance:** Presence and function of Mitochondrial and Plastid DNA;  Plasmids. **Genetic Variations:** Mutations - spontaneous and induced; transposable genetic  elements; DNA damage and repair | Test 1 |
| June 2022 | **Gene Expression:** Modern concept of gene; RNA; Ribosomes; Transfer of genetic  information - transcription and translation; Structure of proteins; Regulation of gene  expression in prokaryotes and eukaryotes | Test 2 |
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**Name of the Teacher –Nisha**

**Class – B.Sc. Pass Course Medical 6th sem**

**Subject- Biochemistry and Plant Biotechnology (6.1)**

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| --- | --- | --- |
| Month | Topics to be covered | Assignments/Test |
|  |  |  |
| March 2022 | Basics of Enzymology: Discovery and nomenclature; characteristics of enzymes; concept of holoenzyme, apoenzyme, coenzyme and co-factors; regulation of enzyme activity;  mechanism of action. | Test |
| April 2022 | Respiration: ATP – the biological energy currency; aerobic and anaerobic respiration;  Krebs cycle; electron transport mechanism (chemiosmotic theory); redox -potential;  oxidative phosphorylation; pentose phosphate pathway. |  |
| May 2022 | Lipid metabolism: Structure and functions of lipids; fatty acid biosynthesis; β-oxidation; saturated and unsaturated fatty acids; storage and mobilization of fatty acids. Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase and its regulation; ammonium assimilation. | Assignment |
| June 2022 | Genetic engineering and Biotechnology: Tools and techniques of recombinant DNA  technology; cloning vectors; genomic and cDNA library; transposable elements; aspects of plant tissue culture; cellular totipotency, differentiation and morphogenesis; biology of  *Agrobacterium*; vectors for gene delivery and marker genes. | Test |