Nowgong Girls' College

Department of Botany

Syllabus Distribution/Unitization

Regular

	.		
Semester I			
BOT-HG-1016	Biodiversity (Microbes, Algae, Fungi and Archegoniate)	Unit 1: Microbes Viruses – Discovery, general structure, replication (general account), DNA virus (T-phage); Lytic and lysogenic cycle, RNA virus (TMV); Economic importance; Bacteria – Discovery, General characteristics and cell structure; Reproduction – vegetative, asexual and recombination (conjugation, transformation and transduction); Economic importance.	Dr. Rakhi Bhattacharyya
		Unit 2: Algae General characteristics; Ecology and distribution; Range of thallus organization and reproduction; Classification of algae; Morphology and life-cycles of the following: Nostoc, Chlamydomonas, Oedogonium, Vaucheria, Fucus, Polysiphonia. Economic importance of algae.	Dr. Neeta Basumatary
		Unit 3: Fungi Introduction- General characteristics, ecology and significance, range of thallus organization, cell wall composition, nutrition, reproduction and classification; True Fungi- General characteristics, ecology and significance, life cycle of Rhizopus (Zygomycota) Penicillium, Alternaria (Ascomycota), Puccinia, Agaricus (Basidiomycota); Symbiotic Associations-Lichens: General account, reproduction and significance; Mycorrhiza: ectomycorrhiza and endomycorrhiza and their significance.	Dr. Rakhi Bhattacharyya
		Unit 4: Introduction to Archegoniate Unifying features of archegoniates, Transition to land habit, Alternation of generations.	Dr. Rakhi Bhattacharyya
		Unit 5: Bryophytes General characteristics, adaptations to land habit, Classification, Range of thallus organization. Classification (up to family), morphology, anatomy and reproduction of	Dr. Neeta Basumatary

		Marchantia and Funaria. (Developmental details not to be included). Ecology and economic importance of bryophytes with special mention of Sphagnum.	
		Unit 6: Pteridophytes General characteristics, classification, Early land plants (Cooksonia and Rhynia). Classification (up to family), morphology, anatomy and reproduction of Selaginella, Equisetum and Pteris. (Developmental details not to be included). Heterospory and seed habit, stelar evolution. Ecological and economical importance of Pteridophytes.	Dr. Neeta Basumatary
		Unit 7: Gymnosperms General characteristics; Classification (up to family), morphology, anatomy and reproduction of Cycas and Pinus (Developmental details not to be included). Ecological and economical importance.	Dr. Zina Moni Shandilya
Semester II			
		Unit 1: Introduction	Dr. Rakhi Bhattacharyya
		Unit 2: Ecological factors Soil: Origin, formation, composition, soil profile. Water: States of water in the environment, precipitation types. Light and temperature: Variation Optimal and limiting factors; Shelford law of tolerance. Adaptation of hydrophytes and xerophytes	
		Unit 3: Plant communities Characters; Ecotone and edge effect; Succession; Processes and types	
		Unit 4: Ecosystem Structure; energy flow trophic organisation; Food chains and food webs, Ecological pyramids production and productivity; Biogeochemical cycling; Cycling of carbon, nitrogen and Phosphorous	
		Unit 5: Phytogeography Principle biogeographical zones; Endemism.	Dr. Zina Moni Shandilya
		Unit 6: Introduction to plant taxonomy Identification, Classification, Nomenclature.	
		Unit: 7 Identification Functions of Herbarium, important herbaria and botanical gardens of the world and India; Documentation: Flora, Keys: single access and multi-access	
BOT-HG-2016	Plant Ecology and Taxonomy	Unit: 8 Taxonomic evidences from palynology, cytology, phytochemistry and molecular data.	

		Unit 9: Taxonomic hierarchy Ranks, categories and taxonomic groups Unit 10: Botanical nomenclature Principles and rules (ICN); ranks and names; binominal system, typification, author citation, valid publication, rejection of names, principle of priority and its limitations. Unit 11: Classification Types of classification-artificial, natural and phylogenetic. Bentham and Hooker (upto series), Engler and Prantl (upto series). Unit 12: Biometrics, numerical taxonomy and cladistics Characters; variations; OTUs, character weighting and coding; cluster analysis; phenograms, cladograms (definitions and differences).	Dr. Neeta Basumatary
Semester III			
BOT-HG-3016	Plant Physiology and Metabolism	Unit 1: Plant-water relations Importance of water, water potential and its components; Transpiration and its significance; Factors affecting transpiration; Root pressure and guttation.	Dr. Neeta Basumatary
		Unit 2: Mineral nutrition Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.	Dr. Neeta Basumatary
		Unit 3: Translocation in phloem Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading	Dr. Neeta Basumatary
		Unit 4: Photosynthesis Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C3, C4 and CAM pathways of carbon fixation; Photorespiration.	Dr. Rakhi Bhattacharyya
		Unit 5: Respiration Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.	Dr. Rakhi Bhattacharyya

		Unit 6: Enzymes Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.	Dr. Rakhi Bhattacharyya
		Unit 7: Nitrogen metabolism Biological nitrogen fixation; Nitrate and ammonia assimilation.	Dr. Zina Moni Shandilya
		Unit 8: Plant growth regulators Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylene.	Dr. Zina Moni Shandilya
		Unit 9: Plant response to light and temperature Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far-red light responses on photomorphogenesis; Vernalization.	Dr. Zina Moni Shandilya
Semester IV			
BOT-HG-4016	Plant Anatomy and Embryology	Unit 1: Meristematic and permanent tissues Root and shoot apical meristems; Simple and complex tissues	Dr. Rakhi Bhattacharyya
		Unit 2: Organs Structure of dicot and monocot root stem and leaf.	Dr. Rakhi Bhattacharyya
		Unit 3: Secondary Growth Vascular cambium – structure and function, seasonal activity. Secondary growth in root and stem, Wood (heartwood and sapwood)	Dr. Zina Moni Shandilya
		Unit 4: Adaptive and protective systems Epidermis, cuticle, stomata; General account of adaptations in xerophytes and hydrophytes.	Dr. Zina Moni Shandilya
		Unit 5: Structural organization of flower Structure of anther and pollen; Structure and types of ovules; Types of embryo sacs, organization and ultrastructure of mature embryo sac.	Dr. Neeta Basumatary
		Unit 6: Pollination and fertilization Pollination mechanisms and adaptations; Double fertilization; Seed-structure appendages and dispersal mechanisms.	Dr. Neeta Basumatary
		Unit 7: Embryo and endosperm Endosperm types, structure and functions; Dicot and monocot embryo; Embryo-endosperm relationship	Dr. Rakhi Bhattacharyya, Dr. Zina Moni Shandilya and Dr. Neeta Basumatary
		SEMESTER V	
BOT-RE-5026	Economic Botany and	Unit 1: Learn about the centres of origin of cultivated plants with special reference to	Dr. Rakhi

	Biotechnology	Vavilov's work	Bhattacharyya
		Unit 2: Learn about the origin, morphology and uses of cereals	Dr. Neeta Basumatary
		Unit 3: Understand about legumes with special reference to Gram and soybean	Dr. Rakhi Bhattacharyya
		Unit 4: Learn about botanical name, family, part used, morphology and uses of spices with special reference to clove and black pepper	Dr. Neeta Basumatary
		Unit 5: Knowledge on morphology, processing and uses of tea	Dr. Rakhi Bhattacharyya
		Unit 6: Learn about fats and oils with special reference to groundnut	Dr. Rakhi Bhattacharyya
		Unit 7: Knowledge on botanical name, family, parts used, morphology and uses of fiber yielding plants with special reference to cotton	Dr. Neeta Basumatary
		Unit 8: A brief knowledge on biotechnology	Dr. Zina Moni Shandilya
		Unit 9: Knowledge on plant tissue culture techniques	Dr. Zina Moni Shandilya
		Unit 10: Learn about blotting techniques, DNA fingerprinting, molecular markers, DNA sequencing and types of PCR. Knowledge on hybridoma technology, ELISA, molecular diagnosis of human	Dr. Zina Moni Shandilya

		disease, and human gene Therapy	
		Unit 11: Understand the aim, scope and branches of bioinformatics, repositories of Biological Data Knowledge and retrieval system	Dr. Zina Moni Shandilya
		Unit 12: Learn about molecular phylogeny, basics in proteomics and genomics and their applications in crop improvement and drug discovery	Dr. Zina Moni Shandilya
		Unit 13: Practical knowledge on economically important plants through specimens, sections and microchemical tests	Dr. Rakhi Bhattacharyya
		Unit 14: Practical knowledge on basic equipments used in tissue culture	Dr. Neeta Basumatary
		Unit 15: Understand anther culture, somatic embryogenesis, endosperm and embryo culture; micropropagation through photograph	Dr. Zina Moni Shandilya
		Unit 16: Practical knowledge on molecular techniques	
		Unit 17: Practical knowledge on data base searching, and retrieval of Sequence from	Dr. Zina Moni

		databases	Shandilya
		Unit 18: Practical knowledge on sequence alignment, Homology and Phylogenetic tree	Dr. Zina Moni Shandilya
		SEMESTER VI	
BOT-RE-6016	Analytical Techniques in Plant Sciences	Unit 1: Learn about principle of microscopy, flow cytometry, applications of fluorescence microscopy, chromosome banding, FISH, chromosome painting; transmission and scanning electron microscopy – sample preparation for electron microscopy, cryofixation, negative staining, shadow casting, freeze fracture, freeze etching	Dr. Zina Moni Shandilya
		Unit 2: Knowledge on different types of centrifugation, marker enzymes	Dr. Rakhi Bhattacharyya
		Unit 3: Learn about use of Radioisotopes in biological research, auto-radiography, pulse chase experiment	Dr. Zina Moni Shandilya
		Unit 4:Learn about principle and application of spectrophotometer in biological research	Dr. Neeta Basumatary
		Unit 5: Knowledge on different chromtoghrapic techniques used in research	Dr. Rakhi Bhattacharyya
		Unit 6: . Learn about mass spectrometry, X-ray diffraction, X-ray crystallography, characterization of proteins and nucleic acids, electrophoresis	Dr. Zina Moni Shandilya
		Unit 7: Understand various statistical methods of analysis, measures of central tendency:	Dr. Neeta

		arithmetic mean, mode, median; measures of dispersion: Range, mean deviation, variation, standard deviation, chi-square test for goodness of fit	Basumatary