

Vidyasagar Evening College
 Department of Botany
 Teaching Plan (2017-2018)

Teachers: Dr. Priyanka Khanduri (PK), Mrs. Mahasweta Das Banerjee (MD)

Theory				
I year				
Module I (50 marks)				
S. No.	Unit	Topics	Classes Allotted	Teacher
1.	Domains of life	Archaea, Bacteria and Eukarya	2	PK
2.	Microbiology	2.1 Plant virus - general characteristics, 2.2 Transmission and Translocation of plant virus, 2.3 Lytic cycle (T4 phase) and Lysogenic cycle (Lambda phage), 2.4 Chemical nature of cell wall of Gram positive and Gram negative bacteria, 2.5 Genetic recombination in bacteria (Conjugation, Transformation, Transduction), 2.6 Industrial uses of bacteria.	8	PK
3.	Algae	3.1. Diagnostic characters and examples of Cyanophyceae, Rhodophyceae, Chlorophyceae, Charophyceae and Phaeophyceae (Lee 1999), 3.2 Life histories of Chara and Ectocarpus, 3.3 Economic importance.	10	MD
4.	Fungi	4.1 Diagnostic characters and examples of Oomycotina, Mastigomycotina, Zygomycotina, Ascomycotina Basidiomycotina, Deuteromycotina (Ainsworth, 1973). 4.2 Life histories of Rhizopus and Ascobolus: 4.3. Economic importance of fungi, 4.4 Fungal symbioses: Mycorrhiza, Lichen and their importance.	10	PK
5.	Plant pathology	5.1 Symptoms - necrotic, hypoplastic and hyperplastic, 5.2 Koch's postulates, 5.3 Biotrophs and Necrotrophs, 5.4 Disease triangle, 5.5 Pathotoxins and phytoalexins (brief concept), 5.6 Symptoms, causal organism, disease cycle and control measures of plant diseases (Late blight of potato, Black steam rust of wheat).	10	PK
6.	Bryophytes	6.1 Amphibian nature, 6.2 Diagnostic characters and examples of Hepaticopsida, Anthocerotopsida and Bryopsida (Proskauer 1957), 6.3 Life histories of Marchantia and Funaria. 6.4 Ecological importance.	10	PK

Module II (50 marks)				
7.	Pteridophytes	7.1 Diagnostic characters and examples of Psilophyta, Lycophyta, Sphenophyta & Filicophyta (Gifford & Foster 1989), 7.2 Life histories of Selaginella and Dryopteris. 7.3 Economic importance.	10	PK
8.	Gymnosperms	8.1 Progymnosperms (brief idea), 8.2 Diagnostic characters and examples of Cycadophyta, Coniferophyta and Gnetophyta (Gifford & Foster 1989), 8.3 Life histories of Cycas and Pinus. 8.4 Economic importance of Gymnosperms.	10	PK
9.	Paleobotany and Palynology	9.1 Importance of fossil study, 9.2 Modes of Preservation. 9.3 Geological time scale. 9.4 Williamsonia (Reconstructed), 9.5 Palynology - Definition, spore & pollen (brief idea), Applications.	8	MD
10.	Angiosperm Morphology and embryology	10.1 Inflorescence types with examples, 10.2 Corolla forms, Aestivation, 10.3 Placentation types, 10.4 Sporogenesis & Gametogenesis, 10.5 Embryo development in Capsella, 10.6 Endosperm development.	10	PK
11.	Taxonomy of angiosperms	11.1 Artificial, Natural and Phylogenetic systems of classification, 11.2 Principles of ICBN, 11.3 Bentham and Hooker's system of classification, 11.4 Phenetics- Brief concept. 11.5 Diagnostic features of the families- Malvaceae, Leguminosae (Fabaceae), Cucurbitaceae, Solanaceae, Labiateae (Lamiaceae), Acanthaceae, Rubiaceae, Compositae (Asteraceae), Gramineae (Poaceae), Orchidaceae.	12	PK
II year				
Module III (50 marks)				
12.	Anatomy	1.1 Stomata - Types (Metcalf & Chalk), 1.2 Mechanical Tissues - Principle and distribution, 1.3 Stellar types and evolution, 1.4 Shoot apex (Tunica-Corpus) and Root apex (Korper-Kappe), 1.5 Secondary growth – normal in dicot stem and anomaly in stem of Tecoma & Dracaena.	12	MD
13.	Cell Biology and Genetics	2.1 Ultrastructure of nuclear envelope, nucleolus and their functions, 2.2 Molecular organisation of metaphase chromosome (Nucleosome concept), 2.3 Chromosomal aberrations deletion, duplication, inversion & translocation, 2.4 Aneuploidy & Polyploidy-types, importance and role in evolution, 2.5 Central Dogma, 2.6 DNA replication - mechanism in prokaryote, 2.7 Transcription, Processing of mRNA and Translation, 2.8 Genetic Code properties, 2.9 Epistasis, 2.10 Linkage group and Genetic map (three-point test cross), 2.11 Mutation - Point mutation (tautomerisation; transition, transversion and frame shift), Mutagen physical and chemical, 2.12 Brief concept of Split gene, Transposons.	38	PK

Module IV (50 marks)				
14.	Biochemistry and Plant physiology	3.1 Proteins - Primary, secondary and tertiary structure, 3.2 Nucleic acid- DNA structure, RNA types, 3.3 Enzyme- Classifications with examples (IUBMB), Mechanism of action. 3.4 Transport in plants - ascent of sap and Xylem cavitation , Phloem transport and source-sink relation, 3.5 Transpiration- Mechanism of stomatal movement, significance 3.6 Photosynthesis Pigments, Action spectra and Enhancement effect, Electron transport system and Photophosphorylation, C3 and C4 photosynthesis, CAM- Reaction and Significance 3.7 Respiration- Glycolysis & Krebs cycle— Reactions and Significance, ETS and oxidative phosphorylation 3.8 Nitrogen metabolism –Biological dinitrogen fixation, Amino acid synthesis (reductive amination and transamination) 3.9 Plant Growth regulators – Physiological roles of Auxin, Gibberellin, Cytokinin, Ethylene, ABA 3.10 Photoperiodism (Plant types, Role of phytochrome and GA in flowering) and Vernalization 3.11 Senescence (brief idea).	32	MD
15.	Economic Botany	Study of the following economically important plants (scientific names, families, parts used and importance) : 4.1 Cereals-rice, wheat, 4.2 Pulses-mung, gram, 4.3 Spices - ginger, cumin, 4.4 Beverages - tea, coffee, 4.5 Medicinal Plants - cinchona, neem, ipecac, vasaka, 4.6 Oil yielding plants- mustard, groundnut, coconut, 4.7 Vegetables-potato, radish, bottlegourd, cabbage, 4.8 Fibre yielding plants-cotton, jute, 4.9 Timber yielding plants- teak, sal 4.10 Fruits- mango, apple, 4.11 Sugar yielding plant- sugarcane.	10	MD
16.	Ecology	5.1 Ecotypes and microclimate, 5.2 Plant succession - stages of succession (hydrosere) 5.3 Ecological adaptation of hydrophytes, halophytes and xerophytes, 5.4 Biodiversity - Definition, levels of biodiversity (genetic, species and ecosystem), methods of in-situ & ex-situ conservation, 5.5 Phytoremediation (brief idea).	8	PK
III year				
Module VII				
17.	Biofertilizer	1.1 Sources 1.2 Production, 1.3 Application.	5	PK
18.	Mushroom	2.1 Food value, 2.2 Cultivation technique of <i>Pleurotus</i> .	5	PK
19.	Plant disease control	3.1 Quarantine, 3.2 Biological control, 3.3 Chemical Control.	5	PK
20.	Plant breeding	4.1 Mass and Pure line selection, 4.2 Heterosis and hybrid seed production.	5	PK
21.	Biometry	5.1 Measures of Central Tendency (Mean, Mode and Median), 5.2 Goodness of fit (Chi- square test)	6	PK
22.	Plant Tissue Culture	6.1 Callus culture and plant regeneration, 6.2 Micropropagation, 6.3 Somatic embryogenesis and	8	PK

		Artificial seed, 6.4 Protoplast culture and applications.		
23.	Recombinant DNA technology	7.1 Recombinant DNA, restriction enzymes, plasmids as vector, 7.2 Gene cloning (basic steps), 7.3 Transgenic plants.	8	PK
24.	Pharmacognosy	8.1 Scope and importance, 8.2 Secondary metabolites- alkaloids, terpenoids, phenolics and their functions, 8.3 Organoleptic evaluation of crude drugs.	8	PK
Practicals				
Module V (50 marks)				
25.	Cryptogams	Work out, microscopic preparation, drawing and labeling, description and identification of the following cryptogams: <i>Chara, Ectocarpus, Rhizopus, Ascobolus</i> .		PK + MD
26.	Angiosperms	Dissection, drawing and labeling, description of angiospermic plants and floral parts, floral formula and floral diagram, identification (family) from the following families: Leguminosae (Fabaceae), Malvaceae, Solanaceae, Labiatae (Lamiaceae), Acanthaceae		PK + MD
27.	Identification with reasons	Cryptogamic specimens (macroscopic/microscopic) as prescribed in the theoretical syllabus. Gymnosperms: Macroscopic - male and female strobilus of <i>Cycas</i> , and <i>Pinus</i> Anatomical slides (stelar types, transfusion tissue, sieve tube, sunken stomata, lenticel). Morphology: Inflorescence types		PK + MD
28.	Spot identification (Scientific names and families) of the following Angiospermic plants	<i>Sida rhombifolia</i> (Malvaceae), <i>Abutilon indicum</i> (Malvaceae), <i>Thespesia populnea</i> (Malvaceae), <i>Cassia sophera</i> (Fabaceae), <i>Tephrosia hamiltonii</i> (Fabaceae), <i>Crotalaria pallida</i> (Fabaceae), <i>Leucaena leucocephala</i> (Fabaceae), <i>Coccinia grandis</i> (Cucurbitaceae), <i>Solanum sisymbriifolium</i> (Solanaceae), <i>Nicotiana plumbaginifolia</i> (Solanaceae), <i>Physalis minima</i> (Solanaceae), <i>Leucas aspera</i> (Lamiaceae), <i>Leonurus sibiricus</i> (Lamiaceae), <i>Anisomeles indica</i> (Lamiaceae), <i>Parthenium hysterophorus</i> (Asteraceae), <i>Tridax procumbens</i> (Asteraceae), <i>Mikania scandens</i> (Asteraceae), <i>Eclipta prostrata</i> (Asteraceae), <i>Eragrostis tenella</i> (Poaceae), <i>Chrysopogon aciculatus</i> (Poaceae), <i>Eleusine indica</i> (Poaceae), <i>Vanda tasellata</i> (Orchidaceae).		PK + MD
29.	Laboratory Records	Laboratory note books (regularly signed) and slides (prepared in class) are to be submitted at the time of Practical Examination		PK + MD
30.	Field Excursion	Local Excursions (at least two including one to Acharya Jagadish Chandra Bose Indian Botanic Garden, Shibpur, Howrah).		PK + MD
31.	Field Records	Field note-book and 15 herbarium sheets of common angiospermic weeds are to be prepared and submitted at the time of Practical Examination.		PK + MD

Module VI (50 marks)			
32.	Plant Physiology	i) Experiment on Plasmolysis. ii) Measurement of leaf area (graphical method) and determination of transpiration rate per unit area by weighing method. iii) Imbibition of water by dry seeds - proteinaceous and fatty seeds. iv) Evolution of O ₂ during photosynthesis (using graduated tube). v) Evolution of CO ₂ during aerobic respiration and measurement of volume.	PK + MD
33.	Anatomy	Anatomical studies of: i) Stem: <i>Cucurbita</i> , Maize. ii) Root: Gram, Orchid. iii) Leaf: <i>Nerium</i> , Tuberose.	PK + MD
34.	Cell Biology	i) Staining (Aceto-orcein) and squash preparation of onion root tip: study of mitotic stages. ii) Determination of mitotic index (from onion root tip).	PK + MD
35.	Identificaiton with reasons	i) Cytological slides of different mitotic and meiotic stages.	PK + MD
36.	Laboratory Records		PK + MD
Module VII (30 marks)			
37.		Acquaintance with laboratory instruments - Autoclave, Incubator, Clinical centrifuge, Analytical balance, pH Meter, Colorimeter, Water bath, Distillation plant.	PK
38.		Sterilization technique by autoclaving	PK
39.		Preparation of PDA medium (slants, pouring of plates).	PK
40.		Bacteria staining by simple staining method (methylene blue/crystal violet) from curd.	PK
41.		Acquaintance with common medicinal plants and their useful parts : Terminalia arjuna, Centella asiatica, Saraca asoca, Adhatoda vasica, Andrographis paniculata, Asteracantha longifolia, Eclipta alba, Aloe barbadensis, Rauvolfia serpentina, Vitex negundo, Herpestis monieria, Holarrhena antidysenterica, Boerhaavia repens.	PK
42.		Determination of Goodness of fit of normal monohybrid ratios (3: 1 and 1: 1) by Chi-square analysis.	PK
43.		Visit to a Medicinal Plant Garden.	PK