PGTRB BOTANY SYLLABUS-2020

(Subject Code: P06)

CONTENTS INCLUDED

Unit-I

i) Viruses - A general account of viruses-Their nature origin purification symptematology methods, transmission and control measures of viruses - Vector relationships, multiplication, Bacterial viruses, algal viruses and mycoviruses.

ii) Bacteria-A general account of bacteria with reference to cell morphology, appendages, envelops and nutrition, growth and reproduction, structure and replication of nucleic acids in Bacteria plasmids and gene manipulation, classification as per Bergey Manual (1973) economic importance of bacteria.

iii) Thallophytes - a) Algae: A comparative study of the range of structure, organisation, reproduction, life history and classification of algae (Bold and Wynne, 1978). Ecology of Algae-Productivity in the sex, algae as indicators meant of pollutions, algicides, economic importance of algae.

b) Fungi -Classification (Alexopoules and Mims 1979). A systematic study of the range of structure, reproduction, life cycles phylogeny and affinities of the main classes of fungi; Economic importance of fungi.

c) Lichens - A general account of lichens - Structure, nutrition; reproduction, classification and economic importance of lichens.

Unit-II

a) Plant Pathology - A general account of plant disease due to fungi, bacteria and viruses with special reference to India Hostmicrobe interaction, principles of disease control, (physical, chemical and biological methods).

b) Microbiology-Soil microbiology-Soil microbes N2 fixation and Bio-geochemical cycles-Food and Water microbiology-Microbial flora of fresh and spoiled foods-Industrial microbiology-Industrial applications of microbes for the manufacture of Alcohols S.C.P. organic acids.

Unit-III

i) Bryophytes: Classification (Watson 1963)-Ecology and distribution-Range of structure in gametophyte and sporophyte and their evolutionary trends - Reproduction and Economic importance of Bryophvtes.

ii) Pteridophytes: Classification (Sporne 1976) - Distribution of extinct and extant forms - comparative study of morphology anatomy of sporophytes-Structure and

development of gametophytes of the major groups (Psilopsida Lycopsida Sphenopsida and peteropsida).

iii) Gymnosperms: Classification (Sporne 1977) - Distribution of extinct and extant forms - Comparative study of morphology, anatomy and reproductions of major groups - Cycadopsida coniferopsida and Gnetopsida evolution of male and female gametophytes and Economic importance.

Unit-IV

i) Morphology: The plant body, the root system, the stem the leaf, the inflorescence, the flower, pollination and fertilization, the fruit and the seed, dispersal of fruits and seeds, vegetative reproduction and Germination.

ii) Taxonomy: History and classification-Artificial system-Linnaeus, Natural system-Jessieu De candolle, Bentham and Hooker, Phylogenetic system-Engler and PrantD. Bessey Hutchinson Recent Trends in systematics-Cyto-taxonomy, Chemotaxonomy, numerical taxonomy. International code of Botanical nomenclature, Herbarium techniques, A critical study of the following families: Ranunculiaceae Magnoliaceae, Polygalacea, Caryophyllaceae, Rubiaceae, Meliaceae, Lythraceae, Cactaceae, Rhizophoraceae, Oleaceae, Aristalochaceae, Casuarinaceae, Dioscoriaceae, Bignoniaceae, Solanaceae, Lauraceae, Loranthaceae, Euphorbiaceae, Arecaceae, Typhaceae and Poaceae.

iii) Economic Botany: Food crops, Cereals, millets, legumes nuts and tropical fruits, sugar yielding crops – spices –Beverage plants – Timbers and pulp yielding plants – Minor forest products – Resins, gums, tannin and rubber yielding plants – oil yielding plants – medicinal plants – fibre yielding plants.

Unit-V

i) Cell Biology: Cytological methods-auto radio graphy – Isolation of cellular components – Fixation – staining – prokaryotes and Eukaryotes. Ultra structure and molecular organization of cell-cell wall, plasma membrane, Endoplasmic reticulam, Mitrochondria, Lysosomes and other cell organelle. Plastids – Classication, morphology, structure – functions Cytoplasm – Physical and Chemical properties. Nucleus – morphology, structure and chemistry – Cell division – Mitosis, meiosis, meiosis and their significance chromosome – morphology, fine structure, Types – giant chromosome, Isochromosome.

ii) Genetics: Mendelian and non-mendelian inheritance – linkage and crossing over. Mutation – Mutagenic agents – structural and chemical basis of mutations in plants cytoplasmic inheritance, Male steribity in plants – Sex determination in plants – sex linked inheritance. Chromosomal aberrations. Molecular genetics – Nucleic acids as genetic material – Types of Nucleic acids – Replication of DNA – Methods and models in DNA repair mechanism – Enzymes – split genes – Jumping and mobilic genes – concepts of gene – Cistron, Muton and recon.

Unit-VI

i) Anatomy: Meristems – General account, classification, various concepts of apical organization of shoots and root apices. Procambium, Cambium and their relationship.

Development of Secondary vascular tissues.

Simple tissues, conductive tissues – Xylem & Phloem.

Wood anatomy – variations in wood structure – tyloses – Heartwood and sapwood – growthrings.

Microtomy: Use of Rotary and Sledge microtomes – whole mounts – Paraffin method – clearing and macerations.

Fixation and fixatives: Staining and stains – Histo – chemistry – cellulose, lignin, enzymes, proteins and nucleic acids.

ii) Embryology : Microsporogenesis and structure of micro-sporangium – Male gametophte. Mega sporogenesis and structure of megasporangium – Female gaetophyte. Present concept of fertlization, endosperm types – Endosperm haustoria.

Unit-VII

i) Plant Physiology: Water relations of plants – Mechanisms; of absorption of water – passive and active – apoplast symplast concept. Stomatal mechanism and Transpiration – Ascent of Sap. Mineral nutrition – Methods of studying plant nutrition. Essential elements – macro and micro nutrients. Asorption of solutes translocation of solutes – pathway and mechanism.

Photosynthesis – Properties of light – interaction between radiant energy and matter. Photosynthetic pigments and pigments and pigment systems. Hill Reaction – Photochemical reaction, Photophosphorylation – Cyclic and non-cyclic and calvincycle.

Respiration – Glycolysis, Krebs cycle, Electron Transport Nitrogen metabolism – Sources of soil nitrogen, Nitrogen fixation. Legume-Rhizobium symbiosis – biochemistry and physiology. Growth and Development – auxins, cytokinins. Gibberellins, phytochromes – role and mode of action.

ii) Bio-chemistry: Chemistry of carbohydrates – classification – structure and function, lipids – classification, occurrence, structure and importance of lipids and phosphates.

Proteins – structure, properties and classification of aminoacids – peptides – structural organization and classification of proteins Nucleic acids – chemistry of Nucleic acids – structure and properties, location and biological significance of DNA – different types of RNA, their origin, properties and fuctions.

Enzymes – Properties, mode of action, nomenclature and classification – factors affecting enzyme activity.

Unit-VIII

i) Plant Breeding: Methods of improvement of crops. Plant introduction – Selection – Heterosis Hybridization – Polyploidy – Mutation breeding.

ii) Bio-Technology: Scope and importance of Bio-technology – Basic techniques – Transformation of E.coli cutting and joining DNA molecules – vectors – Plasmids. Cesmids. Application of recombinant DNA technology in Enzyme engineering – industries in prevention, diagnosis fermentation and cure of diseases (medicine) in the production of bio-fertilisers, bio-insecticides, Tissue culture.

Unit-IX

i) Ecology: Importance of ecology, Ecological factors – their classification and interaction Edaphic factors – Water factors – Fire factors – Biotic factor. Synecology – classification of plant communities Raunkiaer's life – forms – Ecological succession – causes and effects climax concept. Eco system – components and inter relationship. Bio-geo-chemical cycles.

ii) Plant Geography: Principles of Plant Geography Dispersal and migration – Types – Age and Area hypothesis – continuous range, cosmopolitan, circum polar, circum boreal and circum austral, pantropical Discontinuous distribution – Wegner's theory of continental drift.

Unit-X

i) Palaeo Botany: Geological time scale – Techniques of fossil study – Types of fossils and different methods of fossilization – Radio carbondating – study of fossil forms in algae, bryophytes, pteriodophytes and Gymnosperms. Conservation of fossil fuels.