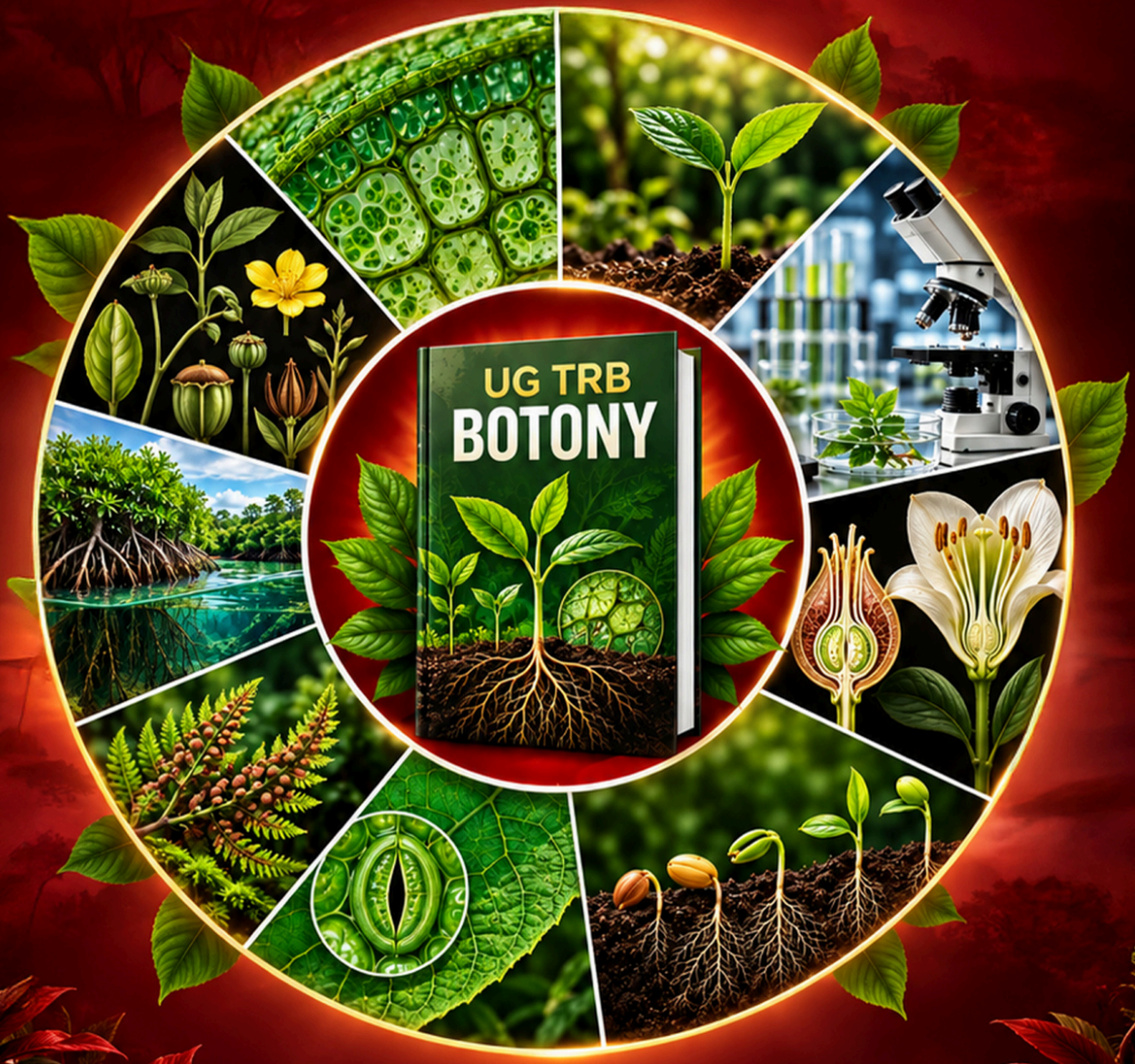
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UNIT-1 VIRUS, BACTERIA, PHYCOLOGY, MYCOLOGY

VIRUS-

Discovery, Structure, Virus infection in plants, and symptoms, Transmission of plant Viruses, Genome Organisation, Replication of Bacteriophages, Economic Importance.

BACTERIA-

Discovery, General Characteristic Features, Cell Structure, nutrition, reproduction, Techniques in Sterilization and Bacterial Culture, Economic importance.

PHYCOLOGY –

General characters, Classification (F.E.Fritsch) Thallus Organisation, Life Cycle Patterns, pigmentation, Evolutionary Trends in The sexuality of Algae – Economic importance.

Structure and reproduction, life cycle of the following algae: Anabaena, Nostoc, Spirulina, Diatoms, Chlamydomonas, Oedogonium.

MYCOLOGY-

General Characteristics, Thallus Organisation, Classification (Alexopolus), Nutrition, Reproduction, Economic importance.

Structure, reproduction and Life cycle of the following: Rhizophus, Agaricus, Puccinia, Cercospora.

UNIT-2 LICHENOLOGY, BRYOLOGY, PTERIDOLOGY

Lichenology-

General characteristics, Thallus Organisation, Reproduction, occurrence, Classification, Ecological importance, Mycorrhiza (EctomyCorrhiza & Endomycorrhiza)

Bryology-

General characters, Classification, structure and reproduction, Economic importance, structure and Life history of Marchantia, Riccia and Polytrichum

Pteridology-

General characters – Classification, based on smith, Structure and life history of Psilotum, Lycopodium, Selaginella, stellar organisation, Heterospory and seed habit, Economic importance.

UNIT-3 GYMNOSPERMS, PALEOBOTANY, EVOLUTION.

Gymnosperms-

General characters, classification (Sporne, 1954), Structure & reproduction, Economic importance, Life history of cycas, pinus and Gnetum.

Paleobotany-

Geological time scale – era, period, epoch, fossilization methods – fossil types – Radio carbon dating, contributions of Birbal sahni.

Evolution-

Origin of Life, Theories of Evolution – Darwin, Lamarck and De vries.

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UNIT-4 ANGIOSPERM - MORPHOLOGY, TAXONOMY AND ECONOMIC BOTANY

Angiosperm morphology-

Root system – Modifications, shoot system – Modifications, Leaf – simple, Compound- phyllotaxy, Modifications of leaf.

Inflorescence – types, Flowers – parts, Aestivation, Placentation, fruits – types and classification.

Taxonomy –

Classification of Angiosperms – Artificial, natural, phylogenetic, Herbarium – techniques, Botanical Nomenclature, Botanical Survey of India.

Study of the following families based on the natural sytem poaceae, cucurbitaceae, asteraceae, solanaceae Arecaceae, Euphorbiaceae Leguminosae lamiaceae & Economic importance of the above familes.

Economic Botany-

Source, Cultivation methods and economically important products of rice, sugarcane, cotton, groundnut.

UNIT-5 ANATOMY AND EMBRYOLOGY

ANATOMY-

Meristems and types, simple permanent tissues, complex permanent tissues (xylem, phloem), Tissue systems & types, Secondary growth, Anomalous Secondary Growth, primary structure of root, stem and leaf of dicots & monocots, krantz anatomy.

EMBRYOLOGY-

Microsporangium, microsporogenesis and development of male gametophyte, Megasporangium, types, Megasporogenesis, development of female gametophyte - Monospory, Bispory, tetraspory, Double fertilization, triple fusion, types of endosperm, Embryo development in dicot & monocots, Apomixis, polyembryony, anther and embryo culture technique.

UNIT -6 MICROBIOLOGY, PLANT PATHOLOGY

Microbiology-

History and scopes of microbiology, Introduction to microbial world – protozoa, bacteria, viruses, mycoplasma, economic importance of bacteria, culture methods and techniques, Fermentation and antibiotic production.

PLANT PATHOLOGY-

History of plant pathology, symptomology of Fungal, viral, bacterial pathogens host defence.

Name the causative organisms, etiology and control measure of the following diseases Blast of rice, wilt of cotton, canker of citrus, powdery mildew disease, Redrot of sugarcane, Tikka of groundnut, Little leaf of brinigal, Bunchy top of banana.

UNIT -7 PLANT PHYSIOLOGY, BIOCHEMISTRY, BIOPHYSICS

PLANT PHYSIOLOGY: -

Water relations of plants – Imbibition, Diffusion, Osmosis, plasmolysis, Mechanism of Water absorption – Ascent of sap, Transpiration – Types, Significance, Mechanism, Factors affecting it, Guttation.

Photosynthesis- C3, C4 CAM pathways.

Respiration – Aerobic, Anaerobic, Glycolysis, kreb's cycle, Electron transport chain, photorespiration Nitrogen Metabolism – Source of nitrogen, Methods of nitrogen Fixation – Metabolism - Symbiontic, non-symbiontic, Nitrogen Cycle.

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Physiology of flowering - photoperiodism – plant growth substances, chemical nature and physiological functions of auxins, Gibberellins cytokinins, ethylene, ABA and Brassinosteriods. BIOCHEMISTRY: -

Biopolymers, carbohydrates, Lipids, proteins, nucleic acids and their monomers.

Enzymes- properties, classification, mode of action-factors affecting enzymes.

BIOPHYSICS: -

Laws of thermodynamics – Concept of free energy, ATP as high energy compound- photo physiology – Light emission – fluorescence, phosphorescence, Bioluminescence, light absorption

UNIT-8 CYTOLOGY, GENETICS, PLANTBREEDING, HORTICUTURE

CYTOLOGY: -

Cell organisation – prokaryotic & Eukaryotic cells, Cell membrane, Cell cycle, mitosis, Meiosis, Amitosis, Cell Organelles – Occurrence, Structure, Function and Origin of ER, Golgibody, Lysosomes, Ribosomes, Mitochondria and chloroplast,

Chromosome- Structure, types, polytene & lampbrush.

GENETICS: -

Mendelism, Monohybrid, Dihybrid crosses, Laws of Mendel, Incomplete dominance, Interaction of factors and genes, Linkage & crossing over, Multiple alleles, Mutations, sex determination in Plants.

PLANTBREEDING: -

Principles involved in plant breeding Methods of crop improvement – Selection, hybridisation Introduction, acclimatization, Heterosis – cause and effects, polyploidy in breeding, Hybridisation technique employed in Cotton, paddy & sugarcane

HORTICUTURE: -

Scope of Horticulture – Classification of Horticulture plants – fruits, Vegetables, ornamentals, Garden design & types – Rockery. Bonsai, Kitchen Garden, Lawn making, Floriculture, Cultivation of commercial plants – Jasmine, Propagation methods, cutting, grafting, Layering, Budding.

UNIT-9 PLANT ECOLOGY, ENVIRONMENT, CONSERVATION BIOLOGY, PHYTOGEOGRAPHY

PLANT ECOLOGY: -

Biotic and Abiotic Factors, plant Succession, Ecological adaptations, Xerophytes, hydrophytes, Epiphytes.

Food chain, Food web, Energy flow- Types of eco system, Ecological pyramids, Nutrient cycles,

ENVIRONMENT: -

Pollution – Air, Water, Soil, Causes and Consequence, Green house effect, Global warming, ozone depletion, acid rain and their impacts, remedial measures – Green building.

CONSERVATION BIOLOGY: -

Natural resource and its conservation (Insitu, Exsitu), Brief account of National and International agencies of conservation – Afforestation.

PHYTOGEOGRAPHY: -

Principles – Vegetation types of India, Tropical evergreen forests, Deciduous forest, Mangrove vegetation and scrub jungle with reference to Tamil Nadu – Raunkiaer's life form, Remote sensing of vegetation photo interpretation.

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UNIT-10 PLANT BIOTECHNOLOGY, BIOINFORMATICS, MOLECULAR BIOLOGY

PLANT BIOTECHNOLOGY: -

History & Scope, Applications of plant biotechnology, Bio fertilizers, Biopesticides, antibiotics, Recombinant Vaccines, Insulin and Interferons – Bio remediation.

Plant tissue culture – Applications of plant tissue Culture, Vectors – Plasmid, Bacteriophages, viral vectors, cosmids, Restriction enzymes, rDNA technology, Development of transgenic plants with reference to insect resistance, edible Vaccines, pros and cons of genetically Modified food (GM food).

BIOINFORMATICS: -

Databases and tools – Biological database 'NCBI' model primary & Secondary databases – BLAST - proteomics and tools, Homology modelling.

MOLECULAR BIOLOGY: -

Nature and function of genetic materials – Nucleic acid – DNA, RNA, Replication of DNA, RNA types, Transcription, protein synthesis, codons, anticodons, gene regulation in prokaryotes – Lac Operon.

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