



BOTANY

1- Cell and molecular biology of plants:-

Structural organization of plant cell, specialized plant cell types
chemical foundation of plant cells, molecule of life, covalent and
noncovalent bonds and their importance, biochemical energetics,

Plasmamembrane, plant vacuole, Chloroplast, Mitochondria:

Nucleus, Ribosomes, Cell shape and Motility, Cell cycle and
apoptosis, Other Cell Organelles (Structure functions of
microtubules Golgibodies, Lysosomes, endoplasmic reticulum),
Techniques use in cell biology.

II- Cytology, Genetics and Cytogenetics

Chromatin Organisation, Structural and Numerical alterations in
chromosomes, Genetics, Gene Structure and Expression, Genetic
recombination and Genetic Mapping, Plasmids, Mutations,
Molecular Cytogenetics, Alien gene transfer through chromosomal
manipulations.

III- Biology and Biodiversity of Viruses, Bacteria, Fungi, Nematodes and Lower Plants:

Viruses, Phytoplasma, Archeobacteria and Eubacteria, General
Characters of fungi, reproduction in fungi, classification account of
Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina
and Deuteromycotina, Phylogeny of Fungi, Economic importance of
fungi. General Character of plant parasite nematodes. Phycology-
Thallophytes structure, reproduction, classification economic uses as food,
biofertilizer and in industry. morphology, anatomy reproduction,
classification of Bryophytes, Economic and ecological importance.
Morphology anatomy classification of pteridophytes, General
account of fossil pteridophytes (Rhynia, Horneophyton,
Asteroxylon) Diagnostic Features of Psilopida, Lycopsida,
Sphenopsida & Pteropsida.

Taxonomy and biodiversity of seed plants

Introduction: Gymnosperms, the vesseless and fruitless seed plant having drop mechanism. Types of pollen grains and ovules, development of male and femal gametophyte.

Classification of gymnosperms (Coulter & chamberlain, Sahni, Sporne and Sandra Holms.) Distribution of living gymnosperms in India Economic importance of gymnosperms.

Brief acount of fossil families: Lygenopteridaceae Medulloseaceae. Ceytoniaceae and Glosspoteridaceae, General account of Cycadeodaceae and cordaitales, Vegetative structure and reproductive organs of cycadales, Ginkogales, Coniferales, Ephedrales and Gnetales.

Taxonomy of Angiosperms, The species concept, Taxanomic evidence, Taxonomic Tools, Systems of Angiosperms classification (Historical background, basis and outline classification of (i) Benthem and Hooker, (ii) Takhtajan, (iii) Bessey, (iv) Hutchinson, (v) Cronquist), Origin of interpolation variation, Diagnostic Characters of following families (Annonaceae, Ranunculaceae, Portulacaceae, Fumeriaceae, Papaveraceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae, Apiaceae, Rhamnaceae, Zhygophyllaceae, Moringceae, Lythraceae, Oleaceae, Acanthaceae, Solanaceae, Lamiaceae, Chenopadiaceae, Euphorbiaceae. Convolulaceae, Schrophulariaceae, Caserarinaceae Liliaceae. Polygonaceae, Commelinaceae, Cyperaceae, Poaceae), Concept of Phytogeography.

Plant Development: Cell wall: Nature formation, growth of cell wall, microscope and submicroscopic structure, function of cell wall, shoot development, Root development, vascular Cambium, Secondary ducts and Laticiferous, Leaf growth and differentiation, Plant Reproduction (Flower Development, genetics of floral organ differentiation. Male gametophyte, female gametophyte, Pollination, Pollen-pistil interaction and fertilization. Self incompatibility, double fertilization and in vitro fertilization), Seed development and fruits Growth,

Plant Physiology and Biochemistry:

Energy flow, Enzymology, Membrane Transport and Trasnlocation of water and solutes, Sensory Photobiology, Fowering process, Plant growth regulators and elicitor, Photochemistry and

Photosynthesis, Respiration and lipid metabolism, Nitrogen Fixation, nitrogen and sulphur metabolism, sensory photobiology, plant growth regulators and elicitors. The flowering process, stress physiology.

Plant Ecology.

Climate soil and major vegetation and soil types of the world, Vegetation organization, Ecosystem Organization, Vegetation Development, Biological diversity, Air, water and soil pollution, Ecosystem stability, Ecological management.

Plant Resource Utilization and conservation:

Plant Biodiversity, World centres of primary diversity of domesticated plants, Origin, Evolution, Botany, Cultivation and uses of - (i) Food (Wheat, Rice) forage (sorghum) and fodder crop (Berseem), (ii) fibre crop (cotton). (iii) Medicinal and aromatic plants, and (iv) Vegetable oil yielding crops. (v) Gums, dyes, Resins. (vi) Raw material for paper making (vii) Important Fire-wood and Timber yielding plants and nonwood forest product (NWFPS): Acacia, Mangifera, Delbergia. Tectona, Shorea, pinus and Cedrus. Strategies for conservation: In-situ conservation, Strategies for conservation: Ex situ conservation, Green Revolution.

Biotechnology and Genetic Engineering of Plant and Microbes

Biotechnology (Basic concept, principles, and scope new Vistas and emerging scenario, role of plant genetics manipulation, Large Scale culture, prospects and problems of genetically modified food). Plant cell and Tissue Culture, Aseptic Technique, Organogenesis, Organ Microculture, Protoplast isolation and somatic hybridization, Recombinant DNA Technology (Gene cloning, principles and techniques, construction of genomic/cDNA

Libraries choice of vectors, DNA synthesis and sequencing, polymerase chain reaction, DNA finger printing) Genetic Engineering of; plants (Aims, strategies for development of transgenic (with suitable examples). Agrobacterium the natural genetic engineer. T-DNA and transposon mediated gene tagging, chloroplast transformation and its utility, intellectual property rights, possible ecological risks and ethical concerns). Microbial Genetic manipulation, Genomics and Proteomics.