Botany (Subject Code-04)

PAPER – I

1. **Microbiology :** Viruses, bacteria, plasmids, structure and reproduction, general account of infection and immunology, Microbes in agriculture, industry and medicine, and air, soil and water, control of pollution using microorganisms.
2. **Pathology :** Important plant diseases in India caused by viruses, bacteria, mycoplasma, fungi and nematodes. Modes of infection, dissemination, physiology and parasitism and methods of control, Mechanism of action of biocides, Fungal toxins.
3. **Cryptogams :** Structure and reproduction from evolutionary aspect, and ecology and economic importance of algae, fungi, bryophytes and pteridophytes, Principal distribution in India.
4. **Phanerogams :** Anatomy of wood, secondary growth, Anatomy of C3 and C4 plants, stomatal types. Embryology, barriers to sexual incompatibility, Seed Structure, Apomixis and Polyembryony, Palynology and its applications. Comparision of systems of classification of angiosperms, modern trends in biosystematics, Taxonomic and economic importance of Cycadaceae, Pinaceae, Genetales, Magnoliaceae, Ranunculaceae, Cruciferae, Rosaceae, Leguminosae, Euphorbiaceae, Malvaceae, Dipterocarpaceae, Umbelliferae, Asclepiadaceae, Verbenaceae, Solanaceae, Rubiaceae, Cucurbitaceae, Compositae, Gramineae, Palmae, Liliaceae, Musaceae and Orchidaceae.
5. **Morphogenesis :** Polarity, Symmetry and totipotency, differentation and dedifferentiation of cells and organs, factors of morphogenesis, Methodology and applications of cell, tissues, organ and protoplast cultures from vegetative and reproductive parts, Somatic hybrids.

PAPER – II

1. **Cell Biology :** Scope and perspective general knowledge of modern tools and techniques in the study of cytology, Prokaryotic and eukaryotic cells, structural and ultrastructural details, functions of organelles including membranes, detailed study of mitosis and meiosis, numerical and structural variations in chromosome and their significance, study of polytene and lampbrush chromosomes structure, behaviour, and cytological significance.

2. **Genetics and Evolution :** Development of genetics and gene concept, structure and role of nucleic acids in protein synthesis and reproduction, Genetic code and regulation of gene expression, gene amplifications, mutation and evolution, Multiple factors, linkage and crossing over, methods of gene mapping, sex chromosomes and sexlinked inheritance, male sterility, its significance in plant breeding. Cytoplasmic inheritance, Elements of human genetics, standard deviation and Chisquare analysis, Gene transfer in microorganisms, Genetic engineering, Organic evolution, evidence, mechanism and theories.

3. **Physiology and Biochemistry :** Detailed study of water relations, Mineral nutrition and ion / transport, Mineral deficiencies, Photosynthesis – mechanism and importance, photosystems I and II, Photorespiration, Respiration and fermentation, Nitrogen fixation and nitrogen metabolism, protein synthesis, Enzymes, importance of secondary metabolites, Pigments as photoreceptors, Photoperiodism, flowering. Growth substances, their chemical nature, role and applications in agri-horticulture.

   Agrochemicals, Stress physiology, Vernalisation, Fruit and seed physiology, dormancy, storage and germination of seed, parthenocarpy, fruit ripening.

4. **Ecology :** Ecological factors, concept and dymanics of community, succession, concept of biospheres, Conservation of ecosystems, Pollution and its control, Forest types of India, Afforestation, deforestation and social forestry, endangered plants.

5. **Economic Botany :** Origin of cultivated plants, study of plants as sources of food, fodder and forage, fatty oils, wood and timber, fiber, paper, rubber, beverages, alcohol, drugs, narcotics, resins and gums, essential oils, dyes, mucilage, insecticides and pesticides, Plant indicators, Ornamental plants, Energy plantation.