

B.Sc. Part –1
Semester –I
Botany Paper –I
(Bacteria, Virus, Lichen and Mycoplasma)

UNIT –I:

General account of bacteria: Classification, structure, mode of nutrition, reproduction and economic importance of bacteria.

UNIT –II:

Structure, reproduction and transmission of plant viruses, symptoms: Leaf curl of Papaya, Tobacco mosaic virus, Leaf curl of tomato, Structure and replication of Bacteriophages.

UNIT –III:

A general account of Mycoplasma: Cell structure growth and reproduction, Mycoplasmal diseases.

UNIT –IV:

General account of Lichen: Distribution, structure, anatomy, reproduction and economic importance.

B.Sc. Part –1
Semester –I
Botany Paper –II
(Fungi)

UNIT –I :

General character, classification (Alexopolous and Mims) & economic importance of fungi.

UNIT –II:

Mastigomycotina: General account, mode of reproduction and life cycle of Synchytrium.

UNIT –III:

Zygomycotina: General account, mode of reproduction. Life cycle of Mucor.

Ascomycotina: General account, mode of reproduction. Life cycle of Peziza.

UNIT –IV:

Basidiomycotina: General account, mode of reproduction. Life cycle of Puccinia.

Deuteromycotina: General account, mode of reproduction. Life cycle of Colletotrichum.

B.Sc. Part –1
Semester –I
Botany Paper –III
(Algae)

UNIT –I :

General character, classification based on Fritsch. Life histories and economic importance of algae including blue green algae (Cyanophyceae) Nostoc, Anabaena, Microcystis, Scytonema.

UNIT –II:

Chlorophyceae: important features. Life cycle of (Volvox, Oedogonium).

Xanthophyceae: Important features. Life cycle of Vaucheria.

UNIT –III:

Phaeophyceae: Important features. Life cycle of Ectocarpus.

UNIT –IV:

Rhodophyceae: Important features. Life cycle of Polysiphonia.

B.Sc. Part –1
Semester –II
Botany Paper –I
(Bryophyta)

UNIT –I :

General characters, classification, Distribution, Economic importance.

UNIT –II:

Heticopsida: Structure, reproduction and life cycle of Riccia, Marchantia.

UNIT –III:

Anthocerosida: Structure, reproduction and life cycle of Anthoceros.

UNIT –IV:

Bryopsida: Structure, reproduction and life cycle of Sphagnum.

B.Sc. Part –1
Semester –II
Botany Paper –II
(Pteridophyta)

UNIT –I :

General characters, classification (Sporne).

UNIT –II:

General features of Rhynia and Selaginella.

UNIT –III:

General features of Equisetum and Marsilea.

UNIT –IV:

Evolution of stellar system, Hetrospory & seed habit.

B.Sc. Part –1
Semester –II
Botany Paper –III
(Gymnosperm)

UNIT –I :

General characters, distributors, classification & evolution.

UNIT –II:

Contribution of Prof. Birbal Sahani, Fossils: Types & Process of Fossilization.

UNIT –III:

Morphology of vegetation, reproductive parts & life history of Cycas & Pinus.

UNIT –IV:

Morphology of vegetative, reproductive parts & life history of Ephedra.

B.Sc. Part –II
Semester –III
Botany Paper –I
(Angiosperm)

UNIT –I :

Systems of Classification Bentham & Hooker, Engler & Prantl, Hutchinson.

UNIT –II:

Botanical nomenclature, Identification Keys. Botanical gardens & Herbaria.

UNIT –III:

Diversity of flowering plants exemplified by ranunculaceae, Fabaceae, (Papilionaceae) Apiaceae, Rubiaceae, Asteraceae.

UNIT –IV:

Diversity of flowering plants exemplified by Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae, Poaceae.

B.Sc. Part –II
Semester –III
Botany Paper –II
(Cytology)

UNIT –I :

Organization, ultra structure, function of cell wall, plasma membrane, nuclear membrane, nucleolus.

UNIT –II:

Structure & function of Endoplasmic reticulum, ribosomes, mitochondria, chloroplast.

UNIT –III:

Cell division: Mitosis, Meiosis and Amitosis, cell cycle.

UNIT –IV:

Extra nuclear genome: Mitochondrial DNA & Chloroplast DNA, Plasmids.

B.Sc. Part –II
Semester –III
Botany Paper –III
(Plant Anatomy)

UNIT –I :

Tissue and Tissue system: (Simple and complex tissues): General structure of dicot and monocot root and dicot and monocot stem.

UNIT –II:

Types of meristematic tissues, Theories of Apical meristem in root and shoot.

UNIT –III:

Anatomy of leaf (Dicot and Monocot), Secondary growth in root and stem.

UNIT –IV:

Abnormal secondary growth with special reference to Nyctanthes, Bignonia, Achyranthes and Mirabilis.

B.Sc. Part –II
Semester –IV
Botany Paper –I
(Plant Resource and Utilization)

UNIT –I :

Economic importance of Fiber: (Jute, Cotton, and Coir), Sugar: (Sugar cane, Sugar beet).

UNIT –II:

Economic importance of Wood: (Plane, Teak, Sal, Sheasam), Rubber: (Hevea Rubber).

UNIT –III:

Economic importance of medicinal plants: (Rauwolfia, Opium, atropa).

UNIT –IV:

Economic importance of Oil yielding plants: (Groundnut, Mustard, Coconut and Castor).

B.Sc. Part –II
Semester –IV
Botany Paper –II
(Genetics)

UNIT –I :

DNA as Genetics material- DNA structure, replication DNA protein interactions, nucleosome model, Centromere, telomere, genetics code.

UNIT –II:

Variation in chromosome structure (deletions, duplications, translocation, inversion).

UNIT –III:

Variation in chromosome number (Aneuploidy, polyploidy).

UNIT –IV:

Genetic inheritance- Mendalisms. Law of purity of gametes, Law of segregation & independent assortment, linkage and crossing over, allelic and non allelic interaction.

B.Sc. Part –II
Semester –IV
Botany Paper –III
(Plant Reproduction)

UNIT –I :

Structure of another, Microsporogenesis and male gametophyte.

UNIT –II:

Types of ovules, Megasporogenesis and female gametophyte.

UNIT –III:

Pollination, double fertilization, formation of endosperm and embryo, fruit development & its maturation.

UNIT –IV:

Vegetative reproduction, apomixes and polyembryony.

B.Sc. Part –III
Semester –V
Botany Paper –I
(Plant Physiology)

UNIT –I :

Diffusion, Osmosis, absorption, transport of water and transpiration, physiology of opening and closing of stomata, factor affecting transportation, translocation of organic solutes transport.

UNIT –II:

Essential micro and macro elements, their role and deficiency symptoms.

UNIT –III:

Historical background, photosynthetic pigments, concept of two photo systems, Z scheme, Photophosphorylation, Calvin cycle, C₃ plant and C₄ plants, CAM plants, photorespiration.

UNIT –IV:

Respiration- Historical aspects, aerobic and anaerobic respiration R.Q. fermentation, decarboxylation of Pyruvic acid, glycolysis, Alternate oxidase system, Kerbs cycle, electron transport chain, oxidative phosphorylation.

B.Sc. Part –III
Semester –V
Botany Paper –II
(Biochemistry)

UNIT –I :

Primary, secondary, tertiary and quaternary structure of proteins and biological role of proteins. Classification, properties of monosaccharide, disaccharides, polysaccharides and biological role of carbohydrates.

UNIT –II :

Enzymes: nomenclature and classification, action, kinetics, active sites, Michaelis constant, Cofactor and Coenzyme, factor affecting enzymatic activity and biological role of enzyme.

UNIT –III:

Lipid: Classification, properties of fatty acids, α , β , omega oxidation of fatty acids, biological role of lipids.

UNIT –IV:

Nitrogen fixation: nitrogen fixing bacteria both symbiotic and free living, mechanism of nitrogen fixation, factors affecting, nitrogen fixation, use of nitrogen fixing microorganism as bio fertilizers.

B.Sc. Part –III
Semester –V
Botany Paper –III
(Plant Biotechnology)

UNIT –I :

History and scope of plant biotechnology: concept of plant growth media and culturing of plant cell, tissue and organs.

UNIT –II:

Basic requirements for plants tissue culture, cellular totipotency, differentiation organogenesis, Micropropagation, somatic seeds.

UNIT –III:

Biology of Agrobacterium, vectors for gene delivery and marker gene, Agrobacterium mediated gene transfer in plant, transgenic plants, and GM plants. .

UNIT –IV:

Genetic engineering: Tools and technique, Recombinant DNA technology, Cloning vectors, Genomics and cDNA library, Molecular markers used in plant biotechnology.

B.Sc. Part –III
Semester –V
Botany Paper –IV
(Ecology)

UNIT –I :

Definition and Scope of Ecology, Environment and environmental factors: Climatic, Topographic, Edaphic and Biotic factors.

UNIT –II:

Plant adaptations (hydrophytes, Xerophytes, Halophytes and Epiphytes).

UNIT –III:

Autecology: Community character and characteristics (frequency, density Abundance, dominance and life forms).

UNIT –IV:

Genetic engineering: Tools and technique, Recombinant DNA technology, Cloning vectors, Genomics

(i) Plant succession: Types and classes

(ii) Ecosystem: Definition, types, components, food chain, food web, ecological pyramid, energy flow, biogeochemical cycle of Carbon, Nitrogen, Phosphorous and Sulphur.

B.Sc. Part –III
Semester –VI
Botany Paper –I
(Microbiology)

UNIT –I :

History and scope of Microbiology, Golden era of microbiology, Development of microbiology in India, Distribution of microorganisms in soil, water and Air.

UNIT –II:

Elementary knowledge of isolation and culture of microorganism, methods of sterilization techniques, Preparation of culture media.

UNIT –III:

Study of Immunology and Serology: Structure of antigens and antibodies, Antigen-Antibody interaction (in-vivo), certain immunological technique: ELISA.

UNIT –IV:

Application of microbiology: Microbial preparation of cheese and curd, alcoholic fermentation, preparation of vaccines, Antibiotics (Penicillin, tetracycline and Streptomycin) and biofertilizer.

B.Sc. Part –III
Semester –VI
Botany Paper –II
(Environmental Pollution)

UNIT –I :

Concept of pollution, types of pollutants, biodegradable & non-biodegradable components.

UNIT –II:

Water pollution-kinds & sources of water pollutants & its control, STP & GAP.

UNIT –III:

- (a) Air pollution, Particulate Mater, gaseous pollutants, O₃ depletion, green house effects, Acid rain, Smog & its control measure
- (b) Noise pollution (source & effects).

UNIT –IV:

Soil pollution (source & effects)

Eutrophication & Biomagnifications.

B.Sc. Part –III
Semester –VI
Botany Paper –III
(Molecular Genetics)

UNIT –I :

Gene Expression- Structure of gene, transfer of genetics information, transcription, role of t-RNA transcription, mechanism of translation.

UNIT –II:

Regulation of gene expression in prokaryotes and eukaryotes, lac operon, trp operon.

UNIT –III:

Genetic variation- Mutation (Spontaneous and induced), mutagens, types of mutation.

UNIT –IV:

Transposable genetic elements (insertion sequences, transposon), DNA damage and repair.

B.Sc. Part –III
Semester –VI
Botany Paper –IV
(Plant Growth)

UNIT –I :

Definition, phases of growth and development, kinetics of growth, seed dormancy, seed germination, seed viability and factors of their regulation.

UNIT –II:

Plant movement, the concept of photoperiodisms and Vernalization, physiology of flowering, physiology of senescence.

UNIT –III:

Plant hormones: (Auxins, Gibberellins, Cytokinins, Abscissic acid and Ethylene) history, biosynthesis and their mechanism of action.

UNIT –IV:

Phyтомorphogenesis, phytochromes and cryptochromes- their discovery, physiological role and mechanisms of action.