

BOTANY DEPARTMENT

Schedule of Work

BSC (Medical) (SEMESTER-I) BOTANY
PAPER-I A: DIVERSITY OF MICROBES (THEORY)

Time: 3 Hrs.

Max. Marks: 35

Paper	Month	Syllabus
I A	July	Algae: <ul style="list-style-type: none">• General characters, classification and Economic importance
	August	Algae: <ul style="list-style-type: none">• Important features and life history of Chlorophyceae–Volvox, Oedogonium, Coleochaete, Xanthophyceae– Vaucheria; Phaeophyceae– Ectocarpus, Sargassum; Rhodophyceae–Polysiphonia
	September	Viruses, Bacteria and Fungi: <ul style="list-style-type: none">• General account of viruses and mycoplasma• Bacteria–structure, nutrition, reproduction and economic importance• General account cyanobacteria• General characters, classification and economic importance of Fungi
	October	Viruses, Bacteria and Fungi: <ul style="list-style-type: none">• Important features and life history of Mastigomycotina–<i>Pythium</i>, <i>Phytophthora</i>; Zygomycotina–<i>Mucor</i>, Ascomycotina–<i>Saccharomyces</i>, <i>Eurotium</i>, <i>Chaetomium</i>, <i>Peziza</i>
	November	Viruses, Bacteria and Fungi: <ul style="list-style-type: none">• Important features and life history of Basidiomycotina–<i>Puccinia</i>, <i>Agaricus</i>; Deuteromycotina–<i>Cercospora</i>, <i>Colletotrichum</i>; general account of Lichens
	December	Exam

BSC (Medical) (SEMESTER–I) BOTANY
PAPER–I B: DIVERSITY OF CRYPTOGAMS (THEORY)

Time: 3 Hrs.

Max. Marks: 35

Paper	Month	Syllabus
I B	July	Bryophyta: <ul style="list-style-type: none"> • Amphibians of plants kingdom displaying alternation of generations • Structure, reproduction and classification of Hepaticopsida (e.g. <i>Marchantia</i>)
	August	Bryophyta: <ul style="list-style-type: none"> • Structure, reproduction and classification of Anthocerotopsida (e.g. <i>Anthoceros</i>), Bryopsida (e.g. <i>Funaria</i>)
	September	Pteridophyta: <ul style="list-style-type: none"> • The first vascular plant • Important characteristics of Psilopsida, Lycopsida, Sphenopsida and Pteropsida, Reproduction in <i>Rhynia</i>, <i>Lycopodium</i>
	October	Pteridophyta: <ul style="list-style-type: none"> • Reproduction in <i>Selaginella</i>, <i>Equisetum</i>, <i>Pteris</i>
	November	Pteridophyta: <ul style="list-style-type: none"> • Reproduction in <i>Marsilea</i>
	December	Exam

BSC (Medical) (SEMESTER-II) BOTANY
PAPER-II A: CELL BIOLOGY (THEORY)

Time: 3 Hrs.

Max. Marks: 35

Paper	Month	Syllabus
II A	January	Structure and Function of: <ul style="list-style-type: none"> • Nucleus: Ultrastructure; nuclear membrane; nucleolus Extranuclear Genome: Presence and function of mitochondrial and plastid DNA; plasmids The Cell Envelopes: Plasma membrane; bilayer lipid structure; functions
	February	Structure and Function of: <ul style="list-style-type: none"> • Golgi, ER, peroxisomes, Vacuoles Chromosome Organization: Morphology; centromere and telomere The Cell Envelopes: the cell wall
	March	Chromosome alterations: <ul style="list-style-type: none"> • Deletions, duplications, translocations, inversions; Meiotic Behaviour • Variations in chromosome number, Aneuploidy, Polyploidy, Meiotic Behaviour
	April	Sex chromosomes
	May	Exam

BSC (Medical) (SEMESTER-II) BOTANY
PAPER-II B: GENETICS (THEORY)

Time: 3 Hrs.

Max. Marks: 35

Paper	Month	Syllabus
II B	January	DNA the Genetic Material: <ul style="list-style-type: none"> • DNA structure; replication; DNA–protein interaction; the nucleosome model; • Genetic code; satellite and repetitive DNA.
	February	Cell Division: <ul style="list-style-type: none"> • Mitosis; meiosis. Genetic Inheritance: <ul style="list-style-type: none"> • Mendelism; laws of segregation and independent assortment; linkage analysis, Allelic and non–allelic interactions.
	March	Gene expression: <ul style="list-style-type: none"> • Structure of gene; transfer of genetic informaton; transcription, translation, protein synthesis, tRNA; ribosomes; • Regulation of gene expression in prokaryotes and eukaryotes • Proteins, ID, 2D, and 3D structure.
	April	Genetic Variations: <ul style="list-style-type: none"> • Mutations, spontaneous and induced; • Transposable genetic elements; DNA, Damage and repair.
	May	Exam

BSC (Medical) (SEMESTER–III) BOTANY
DIVERSITY OF SEED PLANTS & THEIR SYSTEMATICS (THEORY)

Time: 3 Hrs.

Max. Marks: 75

Month	Syllabus
July	<p>Unit I:</p> <ul style="list-style-type: none"> • Characteristics of seed plants • Evolution of the seed habit • Distinguishing features of angiosperms and gymnosperms • Major contribution of cytology, phytochemistry and taxometrics to taxonomy <p>Unit II:</p> <ul style="list-style-type: none"> • General features of gymnosperms and their classification • Evolution and diversity of Gymnosperms including fossil and living gymnosperms
August	<p>Unit II:</p> <ul style="list-style-type: none"> • Geological time scale and fossilization. • Morphology of vegetative and reproductive parts; Anatomy of root, Stem and leaf • Reproduction and life cycle of <i>Pinus</i>, <i>Cycas</i>
September	<p>Unit II:</p> <ul style="list-style-type: none"> • Reproduction and life cycle of <i>Ephedra</i> and <i>Ginkgo</i> <p>Unit III:</p> <ul style="list-style-type: none"> • Angiosperms: Origin and evolution. Some examples of primitive angiosperms. • Angiosperm taxonomy; Brief history, Aims and fundamental components (alpha-taxonomy, Omega-taxonomy, Holotaxonomy) • Identification, keys. Taxonomic literature. • Botanical nomenclature: Taxonomic ranks; Type concept; Principle of priority.
October	<p>Unit IV:</p> <ul style="list-style-type: none"> • Classification of angiosperms • Salient features of the systems proposed by Bentham and Hooker, Engler and Prantl • Diversity of flowering plants as illustrated by members of the families Ranunculaceae, Brassicaceae, Rutaceae, Fabaceae, Apiaceae, Acanthaceae, Apocynaceae, Asclepiadaceae
November	<p>Unit IV:</p> <ul style="list-style-type: none"> • Diversity of flowering plants as illustrated by members of the families Solanaceae, Lamiaceae. Chenopodiaceae, Euphorbiaceae, Liliaceae, Orchidaceae and Poaceae.
December	Exam

BSC (Medical) (SEMESTER-IV) BOTANY
STRUCTURE, DEVELOPMENT AND REPRODUCTION IN
FLOWERING PLANTS (THEORY)

Time: 3 Hrs.

Max. Marks: 75

Month	Syllabus
January	<p>Unit I:</p> <ul style="list-style-type: none"> • The basic body plan of a flowering plant-modular type of growth. • The Shoot System: The shoot apical meristem and its histological organization • Meristematic and permanent tissue, formation of internodes, branching pattern • Monopodial and sympodial growth • Canopy architecture • Cambium and its functions • Formation of secondary xylem • A general account of wood structure in relation to conduction of water and minerals • Characteristics of growth rings, sapwood and heart wood • Role of woody skeleton • Secondary phloem-structure function relationships • Periderm
February	<p>Unit II:</p> <ul style="list-style-type: none"> • Diversity in plant form in annuals, biennials and perennials; trees-largest and longest-lived • Leaf: Origin, development, arrangement and diversity in size and shape; internal structure in relation to photosynthesis and water loss; adaptations to water stress • Senescence and abscission
March	<p>Unit III:</p> <ul style="list-style-type: none"> • The Root System: The root apical meristem; differentiation of primary and secondary tissues and their roles; structural modification for storage, respiration, reproduction and for interaction with microbes. • Vegetative Reproduction: Various methods of vegetative propagation. Detailed study and types of grafting and budding, economic aspects. <p>Unit IV:</p> <ul style="list-style-type: none"> • Flower: A modified shoot; structure, development and varieties of flower; functions; structure of anther and pistil; the male and female gametophytes; types of pollination; attractions and reward for pollinators; (sucking and foraging types)
April	<p>Unit IV:</p> <ul style="list-style-type: none"> • Flower: Pollen-pistil interaction self incompatibility; double fertilization: formation of seed endosperm and embryo; fruit development and maturation. • Significance of Seed: Suspended animation; ecological adaptation; unit of genetic recombination with reference to reshuffling of genes and replenishment; dispersal strategies.

May	Exam
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BSC (Medical) (SEMESTER–V) BOTANY
PLANT PHYSIOLOGY, BIOCHEMISTRY AND BIOTECHNOLOGY (THEORY)

Time: 3 Hrs.

Max. Marks:

75

Month	Syllabus
July	<p>Unit I:</p> <ul style="list-style-type: none"> • Plant-Water Relation: Importance of water to plant life, physical properties of water, (imbibition) diffusion and osmosis, absorption, transport of water and transpiration, physiology of stomata. • Mineral Nutrition: Essential macro-and micro-elements and their role, mineral uptake, deficiency and toxicity symptoms (hydroponics). <p>Unit II:</p> <ul style="list-style-type: none"> • Nitrogen and Lipid Metabolism: Biology of nitrogen fixation, importance of nitrate reductase and its regulation, ammonium assimilation, structure and function of lipids, fatty acid biosynthesis, β-oxidation, saturated and unsaturated fatty acids, storage and mobilization of fatty acids.
August	<p>Unit II:</p> <ul style="list-style-type: none"> • Photosynthesis: Significance, historical aspects, photosynthetic pigments, action and absorption spectra and enhancement effects, concept of two photosystems, z-scheme, photophosphorylation, Calvin, cycle, C4 pathway, CAM plants, photorespiration. • Respiration : ATP-the biological energy currency, aerobic and anaerobic respiration, Krebs's cycle, electron transport mechanism (chemi-osmotic theory), redox potential, oxidative phosphorylation, pentose phosphate pathway.
September	<p>Unit III:</p> <ul style="list-style-type: none"> • Growth and Development: Definitions, phases of growth and development, kinetics of growth, seed dormancy, seed germination and factors of their regulation, plant movements, the concept of photoperiodism, physiology of flowering, florigen concept, biological clocks, physiology of senescence, fruit ripening, plant hormones - auxins, gibberellins, cytokinins, abscissic acid and ethylene, history of their discovery, biosynthesis and mechanism of action, general account of salicylic acid, jasmonates and brassinosteroids, photomorphogenesis, phytochromes and cryptochromes, their discovery, physiological role and mechanism of action. .
October	<p>Unit IV:</p> <ul style="list-style-type: none"> • Genetic Engineering: Tools and techniques of recombinant DNA technology, cloning vectors, genomic and cDNA library, transposable elements, techniques of gene mapping and chromosome walking. • Biotechnology: Functional definition, basic aspects of plant tissue culture, cellular

	totipotency, differentiation and morphogenesis, biology of Agrobacterium, vectors for gene delivery and marker genes, salient achievements in crop biotechnology.
November	Unit I: <ul style="list-style-type: none"> • Transport of Organic Substances: Mechanism of phloem transport, source-sink relationship, factors affecting translocation. Unit III: <ul style="list-style-type: none"> • Basics of Enzymology: Discovery and nomenclature, characteristics of enzymes, concept of holoenzyme, apoenzyme, coenzymes and cofactors regulation of enzyme activity, mechanism of action.
December	Exam

BSC (Medical) (SEMESTER–VI) BOTANY
ECOLOGY AND UTILIZATION OF PLANTS (THEORY)

Time: 3 Hrs.

Max. Marks:

75

Month	Syllabus
January	Unit I: <ul style="list-style-type: none"> • Plants and Environment: Atmosphere (gaseous compositions), water (properties of water cycle), light (global radiation, photosynthetically active radiation), temperature, soil (development, soil profiles, physico-chemical properties), and biota. Morphological, anatomical and physiological responses of plants to water (hydrophytes and xerophytes), temperature (thermoperiodicity and verbalization), light (photoperiodism, heliophytes and sciophytes) and salinity.
February	Unit I: <ul style="list-style-type: none"> • Population Ecology: Growth curves, ecotypes, ecads Unit II: <ul style="list-style-type: none"> • Community Ecology: Community characteristics, absolute and relative frequency, density and dominance, basal area and importance value index (IVI), Whittaker's classification of biodiversity, indices of alpha , beta and gamma diversity, life forms, biological spectrum, ecological succession. • Ecosystem: Structure, abiotic and biotic components, food chain, food web, ecological pyramids, energy flow, biogeochemical cycles of carbon, nitrogen and phosphorus. • Biogeographical Regions of India • Vegetation types of India: Forests and grasslands • Landscape Ecology: Definition & concept, effect of patch size and shape on biodiversity, dynamics of land use.
March	Unit III: <ul style="list-style-type: none"> • Food Plants: Rice, wheat, maize, potato, sugarcane. • Fibres: Cotton and jute.

	<ul style="list-style-type: none"> • Vegetable Oils: Groundnut, mustard and coconut. General account of sources of firewood, timber and bamboos Unit IV: <ul style="list-style-type: none"> • Spices: General account of black pepper, cloves, cinnamomum, cardamon, ginger, tumeric, coriander, fennel and mint.
April	Unit IV: <ul style="list-style-type: none"> • Medicinal Plants: General account of Harar, Bahera, Neem, Amla, <i>Aconitum Rauwolfia, Atropa, Datura, Withania</i> and Poppy. • Beverages: Tea and coffee.
May	Exam

