

Scientist B - Crop Physiology

Name of the post	Subject	Syllabus
Scientist B - Crop Physiology	Agriculture	General Agriculture-All basic courses (Agronomy, Genetics & Plant Breeding, Soil Science & Agricultural Chemistry, Plant Physiology, Plant Pathology, Agricultural Economics & Agricultural Marketing, Statistics, Plant Biotechnology, Plant Biochemistry)
	Botany	Plant Diversity & Evolution: Viruses, Bacteria, Algae, Fungi, Lichens, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms. Plant Structure & Function: Morphology, Anatomy (of angiosperms), Embryology, Plant Physiology, Biochemistry. Genetics & Molecular Biology: Cell Biology, Genetics, Genomics, Recombinant DNA Technology, Plant Biotechnology. Ecology & Environment: Plant Ecology, Phytogeography, Environmental Botany, Plant Pathology. Applied Botany: Economic Botany, Plant Breeding, Phytopathology, Biotechnology Applications.
	Biochemistry	Biomolecules: Structure, properties, and functions of Amino Acids & Proteins, Carbohydrates, Lipids, Nucleic Acids (DNA/RNA). Enzymes: Kinetics, mechanisms, regulation, and classification (biocatalysts). Metabolism: Major pathways like Glycolysis, Citric Acid Cycle, Oxidative Phosphorylation, Fatty Acid Metabolism, Amino Acid Metabolism, Nucleotide Metabolism. Bioenergetics: Energy production (ATP), thermodynamics in biological systems. Molecular Biology: DNA Replication, Transcription, Translation, Gene Regulation (e.g., Lac Operon), PCR. Cell Biology: Cell organelles, membranes, transport, cell signaling. Genetics: Basic principles,

		genetic material, mutations.
	Plant Physiology	Water Relations & Transport: Water potential, osmotic adjustment, transpiration, cohesion-tension theory, root absorption, aquaporins. Mineral Nutrition: Essential elements, uptake mechanisms, deficiency symptoms, functions, mycorrhizae. Photosynthesis: Light & dark reactions, electron transport, C3/C4/CAM pathways, photorespiration. Respiration: Glycolysis, TCA cycle, electron transport chain, oxidative phosphorylation. Plant Hormones (PGRs): Auxins, gibberellins, cytokinins, ABA, ethylene; roles in growth/development. Growth & Development: Photomorphogenesis (phytochrome, cryptochromes), photoperiodism, vernalization, seed physiology. Solute Transport: Translocation of assimilates (phloem loading/unloading).
	Plant Biochemistry	Biomolecules & Cell Biology: Structure/function of carbohydrates, lipids, proteins, nucleic acids. Cell structure (organelles, membranes, cell wall). Cell cycle, division, and protein secretion/targeting. Metabolism & Bioenergetics. Glycolysis, TCA cycle, oxidative phosphorylation. Photosynthesis (light/dark reactions, C3/C4/CAM pathways). Electron transport chains, ATP formation. Plant-Specific Metabolism Nitrogen fixation & assimilation, sulfate reduction. Mineral nutrient uptake and metabolism. Sucrose-starch interconversion, lipid/carbohydrate storage. Plant hormones and signal transduction. Molecular Biology DNA/RNA structure, replication, transcription, translation, genetic code. Gene organization (nuclear, mitochondrial, chloroplast genomes). Genetic engineering, gene cloning, vectors. Techniques Microscopy (light, electron).

		Spectrophotometry, fluorimetry. Chromatography, electrophoresis. Bioinformatics, genomics, proteomics. Applied Plant Biochemistry Plant cell/tissue culture, micropropagation. Biochemistry of food grains, fruits, vegetables (nutrition).
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