

Scientist C - Crop Physiology

Name of the post	Subject	Syllabus
Scientist C - 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	<p>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).</p>
	Plant Biochemistry	<p>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,</p>

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