Scientist C – Genome

Name of the post	Subject	Syllabus
Scientist C - Genome	**Biotechnology**	**Biochemistry:** Biomolecules (carbs, lipids, proteins, nucleic acids), Metabolism, Enzymes, Photosynthesis, Respiration. **Cell Biology:** Cell structure, dynamics, signaling, membrane transport**. Microbiology**: Microbial diversity, culture, growth, antibiotics, human-microbe interactions. **Genetics:** Mendelian genetics, DNA replication, gene expression, mutations, linkage, mapping. **Biophysics & Instrumentation:** Principles, basic math, data analysis, use of equipment (spectroscopy, electrophoresis).
	Molecular Biology	**Foundations & Biomolecules:** Introduction to cells, biomolecules (DNA, RNA, Proteins, Amino Acids), cellular structures, and basic biochemistry.**Central Dogma:** DNA structure, replication (prokaryotic/eukaryotic), transcription (RNA synthesis), and translation (protein synthesis).**Gene Regulation:** Operons, prokaryotic/eukaryotic control mechanisms, chromatin structure, and post-transcriptional/translational modifications. **Molecular Techniques:** PCR, DNA Sequencing, Southern/Northern/Western Blotting, Electrophoresis, Chromatography, Spectroscopy, Calorimetry. **Recombinant DNA & Genetic Engineering**: Vectors, gene cloning, genetic modification, and creating transgenics. **Advanced/Applied Areas:** Genomics, Proteomics, Bioinformatics (BLAST, alignments, modeling), Molecular Evolution, Nanobiotechnology, and Bioethics.
	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.
	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.
	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)
	Plant Biotechnology	**Fundamentals:** Biochemistry, Microbiology, Cell Biology, Genetics, Plant Developmental Biology. **Plant Tissue Culture (PTC): Basics:** Media preparation, sterilization, callus, organogenesis, embryogenesis. **Applications:** Micropropagation, synthetic seeds, cryopreservation, secondary metabolite production. **Advanced:** Protoplast isolation, fusion, somatic hybridization, cybrids, somaclonal variation. **Genetic Engineering & Molecular Biotech:** Recombinant

		DNA Technology, gene cloning, vectors. Transgenic plant development (methods, applications in crop improvement). CRISPR/Gene Editing. Molecular markers, DNA fingerprinting. **Advanced Topics:** Bioinformatics: Databases, sequence analysis, tools. Stress Biology: Plant responses to biotic/abiotic stresses, innate immunity. Phytochemistry & Metabolism: Biosynthesis of secondary metabolites (terpenes, phenolics, etc.). Plant Growth Promoting Bacteria (PGPR). Biosafety & Ethics: GMO regulations, risk assessment, IPR, socio-economic impacts.