632. Bio – Technology

Microbiology:
Screening and selection of micro organisms. Isolation, development and preservation of industially imortant microbes. Transport of nutrients across cell membrane, Energy trnsduction mechanisms. Regulatory mechanisms of metabolic pathways. Production of primary and secondary metabolites, production of primary and secondary metabolites, production of antibiotics, organic acids, biofertilizers, bioleaching, biopesticides.

Moleeular Biology:
Classification, isolation, charcterization, chemical structure and functions of biomolecules. Structure, organization of genome, replication of DNA, damage and repair of DNA, SOS repair, genetic code, transcription of DNA, Strategies for genomic and c-DNA construction and amplification, blotting techniques, DNA sequencing methods, Techniques of gene transfer, DNA finger printing techniques, AFLP, RFLP, RAPD and SSR.

Protein Engineering
Protein structure, teriary and quaternary structures, methods for determination, modeling of proteins, molecular graphics, drug-protein interactions, protein engineering and its benefits in industry and medicine. Kinetics of enzyme reactions, multi substrate reaction mechanisms, Types of enzyme inhibition, enzymes applications in biotransformations, immobilization of enzymes, enzyme electrodes, enzyme sensors.

Bioreactor Design:
Types of Biorectors – Batch, plug flow and continuous, stirred tank reactor, fluidized bed reactor. Analysis of ideal and non-ideal bioreactors, multiphase bioreactors, basic functions of fermentors, design of bioreactors, oxygen and mass transfer co-efficients. MM Kinetics substrate and product inhibitions, design of ehemostat.

Downstream Processing:
Characteristics of bio-products, problems of separation, requirements for the purification of the bio-products. Conditions of the fermentation broth. Solid-liquid separations, filtration centrifugation, types and working of the centrifuges, theory of constant rate and constant pressure filtration. Cell disruption techniques-chemical, mechanical and enzymatic methods. Adsorption-theory and principles liquid-liquid separation-Extraction, theory and principles of extraction. Crystallization, Drying-Drying time and rate curve-chromatography-theory and principles of chromatography – types and applications- GC, HPLC, TLC, Electrophoresis, Membrane separation techniques, membrane modules, reverse osmosis, ultra filtration.

Computational Techniques:
Scope and need of bioinformatics, sequence analysis, computational evolutionary biology.
Natural biological principles behind BLAST, FASTA, MSA, PAM, BLOSSUM.

Phylogenic analysis and models of biological activity, Jukes and prediction, restriction mapping and Lodged method 2D and 3D. Gene identification, homology based gene prediction, restriction mapping and EST approach, protein identification, protein structure and function determination, CATH and SCOP.