MICROBIOLOGY

General Microbiology: History, development and scope of Microbiology, Techniques in Microbiology. Differentiation futures of protists, eubacteria and archaebacteria, Microbial growth: Measurement and phases of growth, Factors affecting bacterial growth, Diauxic growth. Synchronor sgruth growth. growth: chemostat and turbidostat.

Bacterial Physiology: Relations between structure and function in prokaryotes. Endospore structure and process of bacterial sporulation. Physilogy of extremophiles; es: thermophiles, psychrophiles, osmophiles, acidophiles and alkalophiles. Bacterial tuminescence. Gacterial transport system. Siganal transduction and twocomponent regulatory system Bacterial photosynthesis. Bilogical nitrogen fixation. Nitrate and ammonia assimilatory enzymes.

Structure. Function of Biomolecules and Analytical Techniques: Structure, physical and chemical properties of water. Chemical structure, nomenclature, classification, properties and biological significance of carbohydrates. proteins. Function and properties of saturated and unsaturated fatty acids. Biomembrane structure and composition. membrane channels. Components. structures and properties of nucleic acids.Centrifugation, spectrophotometry, Autoradiography, Chromatpgraphy and Electrophoretic techniques-their principles and applications.

Mieroscopy: Priniciples and application of bright field, dark field, phase contrast, fluoreseence, confocal: scanning and transmission electron microscopy.

Agriculture& Environmental Microbiologv; Transformation of carbon, nitrogen and phosphorus. Biofertilixers, Microbial associations Microbiology of air, water and soil. Biogas genearation. Microbial decomposition of cellulose, hemicellulose and lignin. Degradation of pesticides Xenobiotics and plastics. Bioplastic and biopesticides. Microbial adaptation to environmental stress. Biomagnification and bioremediation.Genetically engineered microbes in environment. Green house effect. Biocatalysis, Bioenergeties and Metabolie Pathways:

Enzymes, Structure and Biochemical energeies. Respiratory electron transport. metabolism and regulation of carbohydrates. Biosynthesis of proteins. protein engineering Lipid metabolism.
Molecular Biology and Bacterial Geneties: Conceptes of nucleic acids as genetic material, genome organization DNA replication. Gene transcription. Protein biosynthesis. Concept of reverse transcriptase. Genetic code. Genomics, transcriptomics and proteomics. Mutation Lac, Ara His and Trp opetons and their regulation, Regulation of gene expression. Bacterial genetic recombination: transformation, conjugation and transduction. Restriction and modification. Gene mapping plasmids. Viruses: General properties, strueture and classification. Bacterial, animal and plant viruses and their reproduction. General features of prions and viroids. Lytic cycle of intection. Lysogeny.

Medical Microbiology: Normal microflora of human body. Medically important microbes withrespect o history. pathogenicity, epidemiology. Prophylxis and treatment General characteristics and diseases cause by viruses pathogenic fungal diseases protozoal diseases. Principles of chemotherapy. antibiotics-action mechanism. drug resistance in bacteria,drug sensitivity test.
Microbial Taxonomy: Classification and phylogeny of bacteria. Numerical taxonomy and molecular approaches in taxonomy. Origin of cells and unicellular evolution. Molecular evolution and its mechanism. Evolution of prokaryotic and eukaryotic cells.
ImmunologY: History of immunology: cells and organs of immune system. Active and passive immunity. Antigens. antigenicity and immunogenicity. Adjuvents, haptens. Toxins land toxoids. Types, structures and function of antibodies. Antiboody diversity. Monoclonal and polyclonal antibodies. Defense mechanisms: Specific and Non-specific immunity. Hypersensitivities, Antimicrobial substances Major histocompatability complex: Graft rejection. Immunodeficiency diseases, Blood groups, Rh factor **Interferon ELISA, RIA, vaccination**.
Industrial & Food lMicrobiology: Fermentor systems, scaling up and downstream processing Solid state and submerged fermentations. Microbial production of ethanol: citric and lactic acids" amino acids, glutamic acid, lysine: exzymes-amylases. proter ases and lipases: vitamin-riboflavin: antibioties- penicillin, streptomycin: vinegar, wine, beer and polysaccharides. Microbial

deterioration and control of: leather cotton. paint, wool. fermentation of tea, coffee, and coeoa . Microbes as food and feed. Silage microbiology; Microbial transformation of antibiotics and steroid. Microbial leaching of metal ores. immobilization of microbial cells/enzymes and their use. Common food spoilage, intoxicating and disease causing microbes. Factors affecting microbial growth in foods. Food preservation techniques. food fermentations.Therapeutic use of fermented foods. Food spoilage. Food lpoisoning. Food infections and intoxications.

Modern Microbial Teehnology: Syuthesis of commericial products using microbial system- insuling, interferon, growth hormone, restriction endoncleases. Production of vaccines and therapeutic agents. Bioremediation of xenobiotic compounds and heaveymetals. PGPR Microbial insecticides. Bacillus thuringiensis and its genetic engineering. Ueof Agrobacterium tumefaciens in transgenic plants.