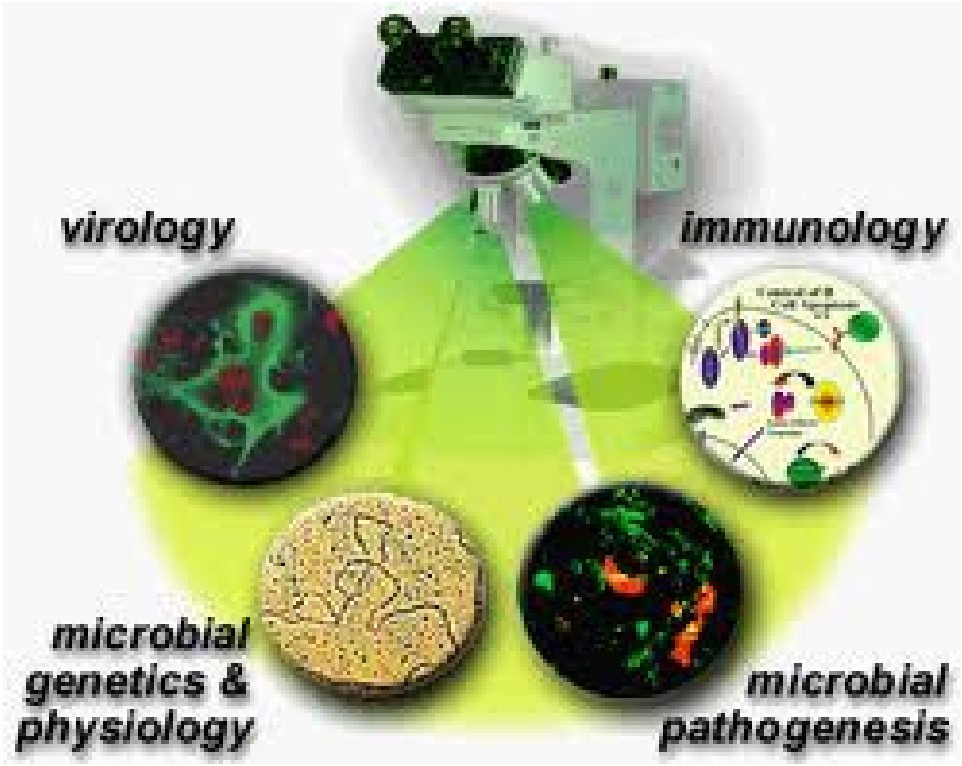
BABA FARID GROUP OF INSTITUTIONS



"Microbiology is the study of those life forms that are essentially unicellular and mostly too small to see with the naked eye. It is an exciting and rapidly developing area of the life sciences and underpins much of the molecular biology and medical developments that are revolutionizing our lives. Progress in our knowledge and understanding of life at this level has contributed to major developments in many areas of biology including genetics, biomedical science, pharmaceuticals, biotechnology, agriculture and ecology, environmental processes, indeed most of biology. A degree in microbiology will provide an excellent preparation for a variety of careers, including the Health Service, pharmaceuticals, medical diagnostics, environmental protection, teaching, scientific research and forensic science. Many recent students have gone on to pursue research (either by becoming a research assistant, or via an Mphil or PhD)."

--Dr. Manish Shrivastav
In-Charge
Department of Microbiology

Syllabus of MSc (Microbiology)

Syllabus of Bacteriology (M B 101)

Unit-1

History of microbiology, Discovery of micro-organism. Spontaneous generation v/s biogenesis. Role of micro-organism in disease, Transformation of organic and inorganic matter, Development of microbiology, Scope and relevance of microbiology,

Unit-2

Morphology and Ultra structure of bacteria, Morphological types, Cell wall of Archaebacteria, Gram negative and gram positive bacteria, Eukaryotes, L-forms, Cell wall synthesis, Capsules types, combination and functions, Cell membrane structure, Composition and properties.

Unit-3

Structure and function of – Cilia, Flagella, and Pili, Gas vesicle, Choromosomes,Carboxysomes,Magnetosomes, Phycobilisomes,and Nucleiod.cell division, Spores, Reserve food materials, Polyhydroxybutarate, phosphate granules, oil droplets, Cyanophycein granules, and sulphur inclusions.

Unit-4

Cultivation of bacteria (aerobic and anaerobic). Shaker and Still. Nutritional types. Culture media. Growth curve. Generation time. Growth kinetics. Batch and continous cultures. Measurement of growth.facters affecting bacterial growth. Control of bacteria physical and chemical agents. Preservation methods.

Unit-5

Microbial evolution, classification of micro-organisms-Haeckel's three kingdom concept.Whittacker five kingdom concept, Eight kingdom classification, Three domains Concept of Carl Woese General relatedness (DNA-DNA Hybridization, 16s rRNA Sequencing), Classification and identification of bacteria, Modern trends of bacterial taxonomy, construction of Phylogenetic tree. Bargey.s system of bacterial classification,
General features of Rickettsia, Mycoplasma, Archaebacteria and Actinomycetes

Syllabus of Virology (M B 102)

Unit-1

General virology, brief outline on discovery of viruses, nomenclature and classification of viruses,Morphology and ultrastructre. Capsids and their arrangements, types of envelops and their compositions , viral genome their types and structures, virus related agents (viroids, virusoids, prions), Cynaophages, morphology.growth cycles .Mycovirus,

Unit-2

General methods of diagnosis and serology, isolation and cultivation of viruses, experiments of animal and cell cultures, primary and secondary cell culture, suspension of cell culture, monolayer cell culture, cell strains, cell lines and transgenic system, Serological test. Haemagglutination, HAI, complement. Fixation.immunoflourescence methods. ELISA, RIA, NASH. using DNA probes.Assay of viruses-physical&chemical methods, (Protein, Nucleic acid, radio activity tracers, electron microscopy), infectivity assay-(plaque methods, end point methods), infectivity assay of plant viruses.

Unit-3

Bacterial viruses- bacteriophage, structral organization, life cycle. One step growth curve, transcription. DNA replication. Eclipse phase,phage production.burst size.lysogenic cycle.bacteriophage typing,application in bacterial genetics, brief details on M13, Mu, T4. lambda.

Unit-4

Plant viruses- classification and nomenclature. Symptoms.viral structures.protein synthesis.effects of viruses on plants.appearance of plants, histology physiology & cytology of plants .common viral diseases of plants- Paddy .cotton .tomato.& sugarcane. Type species of plant viruses. –TMV. CaMV, & Potato virus x,Transmission of plant viruses with vectors (Incects. Nematods. Fungi.)and without vectors. (contacts . seeds dodder. And pollens). Prevention of crop loss due to virus infection. Virus free planting materials,Vector control.

Unit-5

Animal virues – classification and nomenclature of animal viruses. Multiplications of animal viruses.epidemiology . lifecycle pathogenecity. Dignosis. Prevention and treatment of RNA viruses- Picorna . Orthomyxo. Retrovirus.Toga and other arthropod viruses.Rhabdo. Rota. HIV. And other oncogenic viruses. DNA viruses. Pox, herpes, Adeno, SV-40, hepatitis.Interferon and Antiviral drugs

Syllabus of Mycology- Phycology(M B 103)

Unit-1

Historical introduction to mycology , Structure and cell differention, classification ,general feature of mycelial organization and structure , Nutrition and reproduction in fungi, salient feature of division –Myxomycota, Acrasiomycetes, Hydromyxomycetes, Myxomycetes, Plasmodiophoromycetes, Zoosporic fungi- Chytridiomycetes, Hypochytridiomycetes, Oomycetes, Zygomycotina- zygomycetes, trichomycetes.
Evolutionary tendecies in lower fungi. Economic importance of fungi.

Unit-2

Salient features of – Ascomycotina , hemiascomycotina, plectomycetes, pyrenomycetes, Discomycetes, laboulbeniomycetes, oculoascomycetes, Basidiomycotina- teliomycetes, hymenomycetes, Deutromycotina- hypomycetes, coelomycetes, blastomycetes. Economic importance of plant diseases- pythium seed rot, grapes downy mildew, potato Early and late blights, tomato fusarium wilt. wheat - smut and rust.

Unit-3

Heterothalism, sex hormone in fungi. Physiological specialization , phylogeny of fungi, Lichen- ascolichens, basidiolichen, deuterolichens.Mycorrhiza- ectomycorhiza and endomyco rhiza, VAM , fungi as insectsymbionts.fungal diseases, mycoses, systemic
And subcutaneous, candidiasis, Pneumocystis, blastomycoses , dermatophytoses

Unit-4

Fungi and ecosystem- saprophytes, substrates groups and nutritional strategies, sustrate succession, fungi and bio remediation . parasitism, mutualism, and symbiosis with plants and animals, attack on fungi by other microorganism.

Unit-5

Distribution and classification of algae , algal nutrition algal thallus algal reproduction , green algae , diatoms, euglenoids. Brown rhodophyta, pyrrophyta, algal ecology and algal biotechnology.

Syllabus of Biochemistry (M B 104)

Unit -1

Structure & function of cytoplasmic organelles (bacterial and plant cell), specialized structure of cyanobacteria, (hormogones,hormocyst,endospore,exospore, nanocysts akinetes, heterocyst) structure and function of cell component (endoplasmic reticulam,
Golgi appratus, septum.nucleus).

Unit-2

Enzyme as bio catalysts, Enzyme classification ,specificity, active site activity unit, Iso enzyme enzyme kinetics- Michaelis-Menton equation for simple enzymes, Determination of kinetic parameters, multistep reactions and rate limiting steps,Effects of pH and temperature on enzyme action, enzyme inhibition,allosterism, kinetic analysis of allosteric enzymes. Principle of allosteric regulations(simple sequential model and concerted model),

Unit-3

Structural features and chemistry of macromolecules- Nucleic acid, Protein Carbohydrates, and lipids and biomolecules such as antibiotics, pigment ,alkaloids And toxins,

Unit-4

Bioenergetics and energy of metabolism – flow of energy through biosphers, strategy of energy production in cell, oxidation reduction reactions , coupled reactions, and group transfer. ATP production , structural features of bio membranes , transport , free energy and spontaneity of reaction , $G.G^{0.}$ G,& Equilibrium

Unit -5

Microbial metabolism- catabolic principles and breakdown of Carbohydrates, Proteins, Lipids ,and Nucleic acids, Anabolism , biosynthesis of Amino acids , Proteins, Nucleic acids , Lipids and Carbohydrates .Vitamins and their role as coenzymes.

Syllabus of Biophysics (M B 105)

Unit 1

Scope of biophysics. Molecular organization. Different levels. Organization of proteins (Primary, Secondary, Tertiary. Quaternary structure.)

Unit-2

Conformational analysis of nucleic acid and their organization in living cells. Interaction of nucleic acid.

Unit-3

Polysaccharide and lipids, Biological membranes.

Unit-4

Methods in biophysical analysis- CD.ORD. Spectroscopy. Raman spectroscopy. NMR. and X-ray diffraction

Second Semester

PAPER I: MOLECULAR BIOLOGY & MICROBIAL GENETICS (MB – 106)

WEEKS	TOPICS TO BE THOUGHT
Week 1	Nucleic acids as a genetic information carrier (experimental evidence on DNA strands) first aspects and current concepts, melting of DNA, DNA replication, general principles,various mode of replication, isolation and properties of DNA polymerases, proof reading, continous and discontinous synthesis.
Week 2	Inhibitors of DNA replication (blocking precursor synthesis, nucleic acid polymerization, altering DNA structure) asymmetric and dimeric nature of DNA, polymerization and simaltaneous synthesis, leading and lagging strands, DNA polymerases exonuclease activity, eukarayotic DNA polymerases.
Week 3	Gene as a unit mutation and recombination: molecular nature of mutation, mutagens, spontaneous mutation, orgin, DNA damage and repair, type of DNA damage (deamination, oxidative deamination, alkylation, pyrimidine dimer).
Week 4	Repair pathways, methyl directed mis match repair, very short repair, nuleotide excision repair, base excision repair, recombination repair, SOS system.
Week 5	Structural features of RNA(rRNA, tRNA, and mRNA) and relation of function(initiator, elongator, class of tRNA, ribosme binding site on mRNA and co-responding, site on rRNA, peptidyl transferases,activity and 23 s rRNA.
Week 6	Transcripation : general priniciples, basic apparatus, of RNA, polymerases, steps: initiation, elongation and termination. Inhibitiors of RNA: synthesis polycistronic and monocistronic RNAs.
Week 7	Basic features of genetic code. Protein synthesis and steps initiation, elongation and termination, role of various factors in above steps, inhibitors of protien synthesis.
Week 8	Gene transfer mechanisms: transformation, transduction, conjugation and transfection, mechanism and applications.
Week 9	Plasmids: F- factor description and their use in genetic analysis. Colicins and F factors. Plasmids as vectors for gene cloning.
Week 10	Replication of plasmids compatibibility. Bacteriophages: lytic phages-T4, lysogenic phage- lambda and p1, m13 and phy* 174- life cycle, lytic cycle.microbial genetics.
Week 11	Gene conversion: site specific recomination, transposable elements.
Week 12	Non automonomous and automonomous sequences, transposons (structure, mechanism and genetics of transcription).

PAPER II: MICROBIAL PHYSIOLOGY (MB - 107)

WEEKS	TOPICS TO BE THOUGHT
Week 1	Basic aspects of bioenergetics, principles of thermodynamic reactions, entropy, enthalpy.
Week 2	Electron carriers, artificial electron donors, inhibitors, uncouplers, energy bond and phosphorylation.
Week 3	Brief account of bacterical photosynthesis, classification of photosynthetic bacteria, photosythetic pigments.
Week 4	Chlorophyll, bacteriochlorophyll, rhodopsin, carotenoids, phycobil proteins. Autotrophy oxygenic and anoxygenic photosynthetic bacteria and their mechanism .
Week 5	Photosynthetic electron transport system, photo phosohorylation, dark reaction, c3, c4,pathways. Chemolithotrophy, sulphur, iron, hydrogen, nitrogen oxidations, methanogenesis.
Week 6	Respiratory metabolism- glycolysis, EMP pathway, ED pathway, glyoxalate pathway.
Week 7	Krebs cycle, oxidative and substrate level phosphorylation.
Week 8	Reverse TCA cycle- gluconeogenesis, Fermentation of carbohydrates- homo and heterolactic fermentations.
Week 9	Assimilation of nitrogen – dinitrogen, nitrate nitrogen ammonia assimilation, synthesis of major amino acids.
Week 10	Synthesis of polysaccharides- peptidoglycan, biopolymers as cell components.
Week 11	Microbial development, sporulation and morphogenesis, hyphea vs yeast significance
Week 12	Multicellular organization of selected microbes, Dormancy.

PAPER III: IMMUNOLOGY (MB - 108)

WEEKS	TOPICS TO BE THOUGHT
Week 1	Immune system and immunity. History of immunology. Compostion and functions of cell organs involved in immune system. Immune responses. Innate immunity . acquired immunity. Determinants of innate immunity.
Week 2	Species and strains. Individual differences, influence of hormonal influence, nutritional factors and mechanical barriers and surface secretions. Non specific immune mechanisms: surface defences, tissue defences, opsonization, inflammatory reactions. Hormone balance.
Week 3	Antigens and antibodies: antigens- structure and properties, types iso and allo haptens, adjuvants, antigen specificity. Immunogloblobulins- structure, hetergencity; types and sub types, properties(physiochemical and biological) thoeries of antibody production.
Week 4	Complement structure components, properties and functions of different components. Complement pathways and biological consequences of complement activation.
Week 5	Antigen- antibody reactions: in vitro method. Agglunitation, precipitation.

	Complement fixation, immunofluoscence. ELISA, radio immunoassay.
Week 6	Lymphocytes, their subpopulation, their properties and functions. Membrane bound receptors lymph cells. Helper T cells in immune response.
Week 7	T cell suppression in immune response. Development and differentiation of B and T cells.
Week 8	Mechanism of cell mediated immunity, immuno tolerance to self antigen. Synthesis of antibodies and antibody diversity. Hybridoma technology.
Week 9	Major histocompatability complex and tumour immunology: structure and functions of MHC. HL-A system. Gene reactions and Ir- genes. HLA and tissue transplantation, graft verses reaction and rejection.
Week 10	Immune suppression specific and non specific . auto immunity there mechanism and diseases. Tumour immunology, tumour specific antigens, immune response to tumour.
Week 11	Hypersensitivity reactions: antibody – mediated – type 1. Anaphylaxis- type 2 . antibody dependent cell cytotoxicity. Type 3 . immune complex mediated reactions.
Week 12	Type 4 cell mediated hypersensitivity reactions. Defects in immune system; primary and secondary defects, defective complement , defective phagocyte mechanisms.

PAPER IV: FOOD MICROBIOLOGY (MB - 109)

WEEKS	TOPICS TO BE THOUGHT
Week 1	Food as substrate for microorganism: microorganisms important in food microbiology – molds, yeasts and bacteria- general characteristics- classification and importance, principles of the preservation.
Week 2	Asepsis , removal of microorganism, (anaerobic conditions, high temperature, low temperature, drying) factors influencing microbial growth in food- extrinsic and intrinsic factor.
Week 3	Chemical preservatives and food additives, canning processing for heat treatment, B, Z, and F values and working out treatment parameters.
Week 4	Contamination and spoilage – cereals, sugar products, vegetables, fruits, meat and meat products, milk and milk products- fish and sea foods.
Week 5	Poultry- spoilage of canned food, detection of spoilage and characterization .
Week 6	Food- borne infections and intoxication: Bacterical and non bacterical- with example of infective and toxic types- Brucella Bacillus, Clostridium, Escherichia, salmonella, shigella, staphylococcus, vibrio, yersinia.
Week 7	Nematodes. Protozoa, algae, fungi, and viruses. Foodborne outbreaks- laboratory testing procedures.
Week 8	Prevention measures- food sanitation in manufacture and retail trade, for control agencies and its regulations. Aflatoxins- structures and function.

Week 9	Food fermentations: bread, cheese, vinegar, fermented vegetables. Fermented dairy products. Experimental and industrial production methods.
Week 10	Spoilage and defects of fermented dairy products. Oriential fermented foods, their quality standards and controls(HACCP and ISO standards).
Week 11	Food produced by microbes: fermented foods microbial cells as food microbial cells as food(single cell protein) mushroom cultivation. Bioconversions- production of alcohol- fermented beverages –beer and wine.
Week 12	Steroid conversion- industrial enzymes production- amylases, proteinases, cellulases; amino acids production- glutamic acid and lysine productions. Oriential foods: mycoprotien, tempeh, soya sauce ,idli , natto.

Third Semester

PAPER V: ENVIRONMENTAL MICROBIOLOGY (MB - 110)

WEEKS	TOPICS TO BE THOUGHT
Week 1	Aerobiology, droplet nuclei, aerosols, assessment, of air quality. Solid- liquid impingment methods.
Week 2	Brief account of air borne transmission of microbes- viruses- bacteria and fungi their diseases and preventive measures, Aerollergy and Aeroallergens.
Week 3	Aquatic microbiology: water ecosystems - types – fresh water (ponds, lakes, streams)- marine habitats (estuaries, mangroves, deep sea, hydro thermal vents, saltpans, coral reefs) zooplanktons.
Week 4	Water ecosystems- upwelling – eutrophication - food chain, potability of water microorganism.
Week 5	Assessment of water quality- water purification brief account of major borne diseases and their control measures, heavy metal tolerance.
Week 6	Soil microbiology: classification of soils- physical and chemical characteristics, microflora of various soil types (bacteria and nematodes in relevance to soil types) rhizosphere- phyllosphere brief account of microbial interactions.
Week 7	Symbiosis- mutualism- commensalisms , competition, amenalism – synergism- parasitism- predation- biogeochemical cycles and the organisms – carbon, nitrogen, phosphorous and sulphur.
Week 8	Biofertilizer - biological nitrogen fixation- nitrogenase enzyme- nif genes: symbiotic nitrogen fixation- (rhizobium frankia)- non symbiotic microbes azotobacter- azospirillum- (vesicular anbuscular mycorrrhizae- VAM) – ecto, endo pseudomycorrhizae – human microbiology.
Week 9	Waste treatment- waste- type- solid and liquid wastes characterization solid, liquid treatments- physical , chemical, biological, anaerobic- primary , secondary , tertiary waste treatment- saccharification- gasification- composting.
Week 10	Utilization of solid wastes.- (SCP ,mushroom, yeast): fuel (ethanol, methane) fertilizer(composting) liquid waste treatment , trickling- activated sludge – oxidation pond- oxidation ditch. Subterranean microbes . Bioremediation.
Week 11	Positive and negative roles of microbes in environment- biodegradation of recalcitrant compound lignin – pesticides: bioaccumulation of metals and detoxification(biopesticides).
Week 12	Biodeterioration paper- leather, wood, textiles, cosmetics- metal corrosion – mode of deterioration – organs involved – its disadvantages- mode of preventation, GMO and their impact, microbial plastics.

MB 111 Cellular microbiology

Unit-I

Introduction: bacterial diseases. Emergence of cellular microbiology. Cellular biology and interaction, prokaryotic and eukaryotic interactions, bacterial ultrastructure, gene expression, pathogenic islands.

Unit-II

Prokaryotic and eukaryotic signaling mechanisms: eukaryotic cell to cell signaling, Signaling, cytokines. Prokaryotic signaling: Quorum sensing and bacterial pheromones, intracellular signalling pathways.

Unit-III

Infection and cell- cell interactions; bacterial adherence: basic principles, effect of adhesion on bacteria; effect of adhesion on host cells. Bacterial invasion of host cells: mechanism,consequence of invasion, survival after invasion. Protein toxins: classification of toxins, agents of diseases.

Unit-IV

Immune response to bacterial infection: innate response: complement, acute phase, macrophages: cytokines and interferons. Acquired immune response, cell mediated immune response, humoral response.

Unit-V

Cellular microbiology future directions: Comparative genomics and functional genomics, func….. genomics toolbox, genome evolution in microbes. Phylogenetic trees. Cellular microbiology future direction: Web resources for databases.

MB-112 Medical Microbiology

Unit-I

Early discovery of pathogenic microorganisms, development of bacteriology as scientific discription, contributions made by eminent scientists, classification of medically important microorganisms, normal microflora of human body, role of resident flora, normal flora and the human flora, Epidemology: disease cycle (sources of disease, reservoirs and carriers), transmission of pathogens, routes of infection, primary and secondary infections, epidemic, endemic, pandemic diseases

Unit-II

Establishment , spreading, tissue damage and antiphagocytic factors. Mechanism of bacterial adhesion, colonization and invasion of mucous membranes of respiratory, enteric and urogenic tracts. Role of aggresins, depolymerizing enzymes, organotrophisms, variation and virulence. Organs and cells involved in immune system and immune response.

Unit-III

Classification of pathogenic bacteria: *Staphylococcus, Streptococcus, Pneumococcus, Neisseria, Corynebacterium, Bacillus, Clostridium,* non sporing anaerobes. Organisms belonging to Enterobacteriaceae, vibrios, non fermenting gram negative bacilli, *Yersinia, Haemophillus, Bordetella, Brucella Mycobacterium,* Spirochaetes, Actinomycetes, Rickettsiae, Chlamydiae.

Unit-IV

General properties of viruses. Viruses host interaction, Pox viruses, Herpes viruses, Adeno viruses, Picoma viruses, Ortho myxo viruses, Paramyxo viruses, Rhabdo viruses, Arbo viruses, Hepatitis viruses, Oncogenic viruses, HIV. Fungal diseases: Dermatophytes , dimorphic fungi, Opportunistic fungal pathogens, Candidiasis, Pneumocystis, Blastomycosis, Histoplasmosis.

Unit-V

Protozoal infection: *Palsmodium, Trypanosoma, Entamoeba, Balantidium, Pneumocystis. Laboratory* control of antimicrobial therapy-various methods of drug suscepitibility testing, action of antibiotics and drug resistance, antibiotic assay in body fluid. Brief account on available vaccine and schedule, passive prophylactic measure, nosocomial infection, common types of hospital infection and their diagnosis and control.

MB-113 Recombinant DNA Technology

Unit-I

Regulation of gene expression, operon concept, catabolic repression, instability of bacterial RNA, positive and negative regulation, inducers and corepressors. Negative regulation- E.coli lac operon, positive regulation-E.coli arabinose operon. Regulation by attenuation-*his* and *trp* operon. Maturation and processing of RNA: methylation, cutting and trimming of rRNA, capping, polyadenylation and splicing of mRNA. Cutting and modification of tRNA, degradation system. Catalytic RNA:group I and group II intron splicing, RNase P.

Unit-II

Core techniques and essential enzymes used in RDT. Basic concepts of Southern, Northern and Western blotting. Restriction Endonucleases and their types and cleavage sites, ligation, formation of DNA fragments using linkers, adapters and homopolymer tails. Cloning vectors-plasmids, phages, cosmids and shuttle vectors, cloning strategies, introduction of recombinant vectors into bacterial cells-transformation and other methods. Selection of clones- colony hybridization, detection of translation products and immunological methods. Gene library-cDNA and genomic libraries.

Unit-III

Specialized cloning strategies: expression vectors, promoter probe vectors, vectors for library construction- artificial chromosomes,RFLP and RAPD,REC-PCR and their use in DNA fingerprinting.

Unit-IV

PCR methods and application. Applications of RDT in pharmaceutics and medicines-recombinant human growth hormone, insulin, recombinant vaccines, food and agriculture and in production of useful industial products.

Unit-V

DNA sequencing methods-Sanger's and Maxam and Gilbert method. Sequence assembly. Automated sequencing. Whole genome analysis- preparation of ordered cosmid libraries, bacterial artificial chromosome libraries.

MB-114 Microbial Technology

Unit-I

General considerations: metabolic pathways and metabolic control mechanism, primary and secondary metabolites. Biotechnological innovations in the chemical industry, biocatalyst in chemical synthesis, efficiency of growth and product formation, growth stoichiometry, energy requirement and maximum biomass yield. P/O quotients, metabolic overproduction, growth efficiency.

Unit-II

Shake flask cultures. Fermentation in batch cultures, microbial growth kinetics, measure growth (cell number, direct and indirect methods), grpwth and nutrients, growth and formation, heat evolution, effect of environment (temperature, pH, high nutrient, control media formulation, sterilization, kinetics of thermal death of microorganisms,batch and continuous sterilization, stirred tank, airlift fermenter, fed batch, continuous and immobilized fermentation, fermenter design, instrumentation and control, large scale production.

Unit-III

Aeration and agitation, oxygen transfer kinetics, concepts of Newtonian and non Newtonian plastic fluids, apperent viscosity, foam and antifoam

Unit-IV

Industrial production of antibiotics (β lactam and rifamcyin), citric acid, acetic acid, ethanol. Enzymes (pectinases, amylases, lipases, proteases, cellulases). Amino acids (glutamine and lysine) vitamins (riboflavin and cynocobalamine), steroids, Biofertilizers, biopesy, mushroom production, frmented food beverages, biopolymers.

Unit-V

Industrial strains, strategies for selection and improvement. Preservation and maintenance, operation and containment of recombinant organisms, scale up, large scale production, recombinant microorganisms . Product recovery(down streaming)

MB- EL A 115 Diagnostic Microbiology and Immunology

Unit-I

Fixation of smears for microscopy by different methods

Different staining techniques

- Simple (Loeffer's polychrome methylene blue and negative staining)
- Gram's attaining
- Ziehl-Neelsen method for Acid fast staining
- Fluorchrome staining
- Leishman's stain
- Giemsa's staining
- Special staining methods to demonstrate granules, capsules and spores

- Preparation of culture media, simple tissue culture methods for growing different microorganisms

Conventional and rapid method of isolation and identification of pathogenic bacteria, fungi
Anaerobic culture methods
Principle of automated methods for diagnostic microbiology
Isolation of pure cultures and preservation techniques
Drug susceptibility testing by various methods
Diagnostic immunologic principles and methods
-**Precipitation method**- Immunodiffusion and Immunoelectrophoresis
-**Agglutination method**- Widal Test and Haemagglutination
ELISA METHOD: Separation of serum protein by electrophoresis, Separation and characterization of lymphocytes from bood Demonstration of lymphocytes sub population

Fourth Semester

This Semester is complete Dissertation work.