



[Estd. 1945]

BHS Higher Education Society

VIJAYA COLLEGE

Affiliated to Bengaluru City University

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Conferred "College with Potential for Excellence" by the UGC

RV Road, Basavanagudi

Bangalore - 560004

Tel: +91-80-26933220/221

Email: vijayadegree@gmail.com

principal@vijayacollege.ac.in

Website: www.vijayacollege.ac.in

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

ACADEMIC YEAR/SEMESTER	2024-25	II Semester
DEPARTMENT	MICROBIOLOGY	
SUBJECT/PAPER	MBT 201: Microbial Biodiversity and Culture Techniques	

MONTH -1 (March)

WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Syllabus discussion	MS
	2	Early developments of virology	KM
	3	General characteristics, classification, cell structure, and reproduction of Cyanobacteria	MS
	4	General structure and properties of viruses	KM
2	1	Type study : Nostoc	MS
	2	Virus purification and assay	KM
	3	Type study : Spirulina	MS
	4	Principles of Viral Taxonomy	KM
3	1	Ultrastructure of the fungal cell	MS
	2	Structure, reproduction, cultivation and significance of: Bacteriophages - T4	KM
	3	Salient features, classification, reproduction and significance of major groups of fungi	MS
	4	Structure, reproduction, cultivation and significance of: Bacteriophages - Lambda	KM
4	1	Phycomycetes - Rhizopus	MS
	2	Structure, reproduction, cultivation and significance of Plant viruses (TMV)	KM



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	3	Ascomycetes - Aspergillus	MS
	4	Structure, reproduction, cultivation and significance of Animal viruses (HIV)	KM
TEST 1			

MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Ascomycetes - Saccharomyces	MS
	2	Structure, reproduction, cultivation and significance of Animal viruses (Herpes)	KM
	3	Basidiomycetes	MS
	4	Structure, reproduction, cultivation and significance of Animal viruses (Corona virus)	KM
2	1	Dueteromycetes - Fusarium	MS
	2	Prions and Viroid's - Nature and significance	KM
	3	Protozoa - General features, classification and significance	MS
	4	Macronutrients, micronutrients, and growth factors -	KM
3	1	Culture media -Synthetic and non-synthetic -solid, liquid and semi-solid media	MS
	2	Nutritional types of microorganisms: Autotrophs and heterotrophs, phototrophs and chemotrophs	KM
	3	Special Media - Enriched, selective, transport, differential, maintenance and enrichment media	MS
	4	Physical factors affecting the growth of microorganisms: Temperature, pH and Oxygen	KM
4	1	Methods of isolation of bacteria, and fungi	MS
	2	Bacterial growth curve, phases of growth, generation time	KM



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MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
	3	Maintenance of Pure cultures. Cultural collection centres.	MS
	4	Synchronous culture and Diauxic growth	KM
TEST 2			

MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Definition and classification of Antibiotics	MS
	2	Continuous culture - Chemostat and Turbidostat	KM
	3	Mode of action of antimicrobial agents	MS
	4	Enumeration of bacteria -Viable count -SPC	KM
2	1	Antibacterial - Penicillins, Cephalosporins	MS
	2	Total count - DMC and turbidimetric estimation	KM
	3	Antibacterial -Polymyxins, Streptomycin, and Tetracyclines	MS
	4	Structure and organization of biological membranes	KM
3	1	Antifungal – Amphotericin and Griseofulvin	MS



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MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
	2	Types of cellular transport – Passive, active, membrane bound protein transport	KM
	3	Antiviral – AZT and Acyclovir	MS
	4	Ion channels and Na ⁺ K ⁺ ATPase	KM
4	1	Development of Antibiotic resistance in microbes - a brief account	MS
	2	Revision	KM
	3	Discussion of university question papers	MS
	4	Class test	KM



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ACADEMIC YEAR/SEMESTER	2024-25	IV Semester
DEPARTMENT	MICROBIOLOGY	
SUBJECT/PAPER	MBL 104: Microbial Enzymology and Metabolism	

MONTH -1 (March)

WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	EMP pathway	KM
	2	Introduction to enzymes. Definition, enzyme unit, specific activity and turnover number	MS
	3	HMP pathway	KM
	4	Properties of enzymes	MS
2	1	ED & PK pathway	KM
	2	Classification of enzymes	MS
	3	TCA cycle	KM
	4	Exo/endo enzymes, constitutive/ induced enzymes, isozymes	MS
3	1	Fermentation balance, concept of linear and branched fermentation pathways	KM
	2	Monomeric, Oligomeric and Multimeric enzymes	MS
	3	Alcohol fermentation and Pasteur effect	KM
	4	Multienzyme complex: pyruvate dehydrogenase; isozyme: lactate dehydrogenase	MS
4	1	Butyric acid and Butanol-Acetone Fermentation, Mixed acid and 2,3-butanediol fermentation	KM
	2	Ribozymes, Abzymes	MS
	3	Propionic acid Fermentation, acetate fermentation.	KM



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	4	Apoenzyme and cofactors	MS
TEST 1			

MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Chemolithotrophy-Oxidation of Hydrogen, Sulphur	KM
	2	Prosthetic group-TPP, coenzyme, NAD, metalcofactors	MS
	3	Chemolithotrophy-Oxidation of Iron & Nitrogen	KM
	4	Mechanism of action of enzymes	MS
2	1	Anaerobic respiration- dissimilatory nitrate education and sulphate reduction.	KM
	2	Activesite, transition state complex and activation energy	MS
	3	Nitrogen fixation, Ammonia assimilation.	KM
	4	Lock and key hypothesis and Induced Fit hypothesis	MS
3	1	Assimilatory nitrate reduction, dissimilatory nitrate reduction, denitrification	KM
	2	Multi substrate reactions- Ordered, Random and Ping-pong	MS
	3	Biosynthesis of nucleic acids : De novo pathway	KM
	4	Enzyme Kinetics: Kinetics of one substrate reactions	MS
4	1	Biosynthesis of nucleic acids : Salvage pathway	KM
	2	i. Equilibrium assumptions ii. Steady-state Assumptions iii. Lineweaver-Burk, Hanes-Woolf, Eadie-Hofstee equations and plots.	MS
	3	Aminoacid degradation and biosynthesis	KM
	4	Kinetics of enzyme inhibition. Competitive, non-competitive and uncompetitive inhibition.	MS



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MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
TEST 2			

MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	β -oxidation of palmitic acid;	KM
	2	Effect of changes in pH and temperature on enzyme catalyzed reaction.	MS
	3	Biosynthesis of palmitic acid.	KM
	4	Kinetics of two substrate reactions. Pre steady state kinetics.	MS
2	1	Acetogens: Autotrophic pathway of acetate synthesis	KM
	2	Kinetics of immobilized enzymes	MS
	3	Ethanol oxidation, sugar alcohol oxidation.	KM
	4	Enzyme regulation: Allosteric enzyme - general properties, Hill equation, Koshland Nemethy and Filmer model	MS
3	1	Glyoxylate and glycolate metabolism	KM
	2	Monod Wyman and Changeux model	MS
	3	Dicarboxylic acid cycle	KM



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MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
	4	Covalent modification by various mechanisms. Regulation by proteolytic cleavage - blood coagulation cascade.	MS
4	1	Glycerate pathway	KM
	2	Regulation of multi-enzyme complex- Pyruvate dehydrogenase. Feedback inhibition.	MS
	3	Beta hydroxyl aspartate pathway	KM
	4	Oxalate as carbon and energy source	MS



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ACADEMIC YEAR/SEMESTER	2023-24	VI Semester
DEPARTMENT	MICROBIOLOGY	
SUBJECT/PAPER	MBL106-I; Immunology and Medical Microbiology	

MONTH -1 (March)

WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Importance of normal microflora, normal microflora of skin, throat, gastrointestinal tract, urogenital tract	MS
	2	Historical perspective of immunology	KM
	3	Host pathogen interaction: Definitions: Infection, Invasion, Pathogen, Pathogenicity, Virulence, Toxicogenicity	MS
	4	Immunity: Natural (active and passive) and artificial (active and passive)	KM
2	1	Host pathogen interaction: Carriers and their types, Opportunistic infections, Nosocomial infections. Transmission of infection.	MS
	2	Innate and acquired, Humoral and cell mediated.	KM
	3	Bacterial diseases: Haemophilus influenzae, Mycobacterium tuberculosis	MS
	4	Cells and organs of immune system	KM
3	1	Bacterial diseases: Mycobacterium tuberculosis	MS
	2	Cells and organs of immune system	KM
	3	Bacterial diseases: Salmonella typhi	MS
	4	Hematopoiesis, cytokines	KM
4	1	Bacterial diseases: Vibrio cholera	MS
	2	Properties and functions of B and T Lymphocytes	KM
	3	Bacterial diseases: Bacillus anthracis, Clostridium tetani	MS



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	4	Natural killer (NK) cells, Granulocytes (Neutrophils, Eosinophils and Basophils)	KM
TEST 1			

MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Viral diseases: Hepatitis	MS
	2	Monocytes and macrophages, Dendritic cells and Mast cells	KM
	3	Viral diseases: Rabies	MS
	4	Primary lymphoid organs; Bone marrow and Thymus	KM
2	1	Viral diseases: Dengue, Chikungunya	MS
	2	Secondary lymphoid organs; Spleen and Lymph nodes.	KM
	3	Viral diseases: AIDS	MS
	4	Antigen: Immunogenicity and antigenicity	KM
3	1	Viral diseases: Corona, Influenza	MS
	2	Epitopes, B and T cell epitopes, Haptens	KM
	3	Protozoan diseases: Malaria	MS
	4	Properties and Chemical nature of antigen.	KM
4	1	Fungal infection: Pedis (Athlete's foot)	MS
	2	Antibody: Basic structure of antibody, light and heavy chain, variable and constant region, hinge region, Fab and Fc.	KM
	3	Fungal infections: Candidiasis.	MS
	4	Structure and functions of different types of antibodies (IgM, IgG, IgA, IgE, and IgD).	KM



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WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
TEST 2			

MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Antimicrobial agents: General characteristics & classification	MS
	2	Antibody dependent cell mediated cytotoxicity (ADCC).	KM
	3	Inhibitors of Cell wall, Cell membrane	MS
	4	Antigenic determinants on immunoglobulins: Isotype, allotype and idiotype.	KM
2	1	Inhibitors of Nucleic acid and Protein synthesis; Inhibitors of metabolism.	MS
	2	Monoclonal antibody production by hybridoma technology	KM
	3	Mechanism of action of Amphotericin B, Cephalosporin, Penicillin	MS
	4	Affinity and avidity.	KM
3	1	Mechanism of action of Tetracyclin, Griseofulvin, Amantadine	MS
	2	Immunoprecipitation; Radial (Mancini) and double (Ouchterlony) immunodiffusion	KM
	3	Mechanism of action of Acyclovir, Azidothymidine	MS
	4	Agglutination reactions: Hemagglutination and Bacterial agglutination.	KM



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MONTH -3 (May)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
4	1	Antibiotic resistance microbes	MS
	2	Enzyme linked immune-sorbent assay (ELISA).	KM
	3	Hypersensitivity reactions: Definition and Classification	KM
	4	Discussion of Old question papers & Revision	MS

ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

ACADEMIC YEAR/SEMESTER	2024-25	VI Semester
DEPARTMENT	MICROBIOLOGY	
SUBJECT/PAPER	MBL106-II; Microbial Genetic Engineering and Industrial Microbiology	

MONTH -1 (March)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Definition of genetic engineering, milestones in genetic engineering, scope of genetic engineering.	KM



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	2	Introduction to Industrial microbiology : Scope and concepts	MS
	3	Mode of action and applications of restriction enzymes, DNA polymerases, methylases, Terminal deoxynucleotidyl transferase	KM
	4	Criteria for selection of industrially important microbes	MS
2	1	Kinases, Phosphatases and DNA ligases in genetic engineering	KM
	2	Fermentor: Basic features; design and components of a typical fermentor	MS
	3	Definition, uses and properties of Plasmid vectors	KM
	4	Sterilization of fermentor, Control of air, temperature, pH, foaming and feed.	MS
3	1	pBR and pUC series	KM
	2	Fermentation media: Strategies for media formulation; Natural and synthetic media	MS
	3	Bacteriophage lambda, cosmids.	KM
	4	Role of buffers, precursors, inhibitors, inducers and micronutrients.	MS
4	1	Cloning in Escherichia coli and Saccharomyces cerevisiae.	KM
	2	Types of fermentation process: Submerged fermentation	MS
	3	Gene Library: Construction of cDNA library, genomic library.	KM
	4	Types of fermentation process: Solid state fermentation (Koji)	MS
TEST 1			

MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Isolation of DNA	KM
	2	Objectives and significance of downstream processing	MS



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MONTH -2 (April)			
WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
	3	Restriction digestion and ligation of DNA	KM
	4	Overview of steps in product extraction and purification	MS
2	1	Agarose gel electrophoresis	KM
	2	Biomass separation- Filtration and centrifugation	MS
	3	Blotting techniques- Southern blotting, DNA microarray analysis.	KM
	4	cell disruption- Physical, chemical and biological methods	MS
3	1	PCR techniques and applications.	KM
	2	Product extraction, purification	MS
	3	DNA transfer methods: Microinjection, Electroporation	KM
	4	Recovery and product testing	MS
4	1	Liposome mediated DNA transfer	KM
	2	Industrial production of microbial products: Antibiotics (Penicillin)	MS
	3	Identification and selection of recombinants.	KM
	4	Industrial production of microbial products: Enzymes (Amylase)	MS
TEST 2			



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WEEK	DAY	PORTIONS PLANNED FOR 1 HOUR	FACULTY
1	1	Application of recombinant microorganisms in basic research, industry	KM
	2	Industrial production of microbial products: anti-cholesterol compounds	MS
	3	Application of recombinant microorganisms in medicine, agriculture, environment	KM
	4	Industrial production of microbial products: , anti-cancerous compounds	MS
2	1	Products of recombinant DNA technology	KM
	2	Industrial production of microbial products: hormones (Insulin).	MS
	3	Products of human therapeutic interest - insulin, hGH	KM
	4	Bt transgenic - cotton, brinjal	MS
3	1	Gene therapy	KM
	2	Recombinant vaccines	MS
	3	Gene therapy	KM
	4	Biological, ethical and social issues of gene cloning	MS
4	1	IPR	KM
	2	Revision	MS
	3	Class Test	KM
	4	Discussion of University Question papers	MS



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