

K.T.S.P.MANDAL'S
SAHEBRAOJI BUTTEPATIL MAHAVIDYALAYA
RAJGURUNAGAR

SYLLABUS COMPLETION REPORT 2023-2024

DEPARTMENT OF MICROBIOLOGY

SEMESTER III

S.Y.B.Sc.

Subject –MB – 212: BACTERIAL PHYSIOLOGY AND FERMENTATION TECHNOLOGY

Teacher Name –Prof.S. P. TAKALE

Month	Unit	Topics
August –2023	1	Enzyme -apoenzymes, prosthetic group and cofactors. b. Nomenclature & classification as per IUB (up to class level). c. Models for catalysis – i. Lock and key ii. Induced fit iii Transition state. d. Effect of pH & temperature, substrate concentration & enzyme concentration, activators, and inhibitors of enzyme

<p>August – September 2023</p>	<p>2</p>	<p>Bacterial Physiology</p> <ul style="list-style-type: none"> a. Definitions of Metabolism, catabolism, anabolism, respiration, and fermentation b. Metabolic pathways (with structures) <ul style="list-style-type: none"> 1. Embden Meyerhof Parnas pathway (Glycolysis) 2. Hexose monophosphate pathway 3. EntnerDoudoroff pathway 4. Phosphoketolase pathway (Pentose and hexose) 5. TCA cycle (with emphasis on amphibolism) and Glyoxylate bypass 6. Gluconeogenesis and its significance
<p>September 2023</p>	<p>3</p>	<p>FERMENTATION TECHNOLOGY</p> <p>Concept of fermentation technology</p> <ul style="list-style-type: none"> a. Microbial biomass- based fermentation (Biofertilizer, biopesticide, Probiotics) b. Production of Primary metabolites (Organic acids, amino acids, vitamins, enzymes) c. Production of Secondary metabolites (Antibiotics) d. Production of recombinant products (insulin and growth hormones) e. Production of Fermented food products (Cheese, yoghurt) f. Microbial bio transformation (Steroid transformation) <p>Design of a Fermenter (typical CSTR Continuous stirred Tank Reactor): Different parts and their working</p> <p>Monitoring of different fermentation parameters (Temperature, pH, aeration, agitation, foam)</p>
<p>October 2023</p>		<p>Strains of industrially important microorganisms:</p> <ul style="list-style-type: none"> i. Desirable characteristics of industrial strain ii. Principles and methods of primary and secondary screening iii. Master, working and seed culture; development of inoculum iv. Preservation and maintenance of industrial strains.

		<p>Types of fermentations: Batch, continuous, dual</p> <p>Media for industrial fermentations: Constituents of media (Carbon source, nitrogen source, amino acids vitamins, minerals, water, buffers, antifoam agents, precursors, inhibitors, and inducers)</p>
October 2023		<p>Contamination: Sources, precautions, and consequences Revision and assignment</p>

As per above syllabus completed theory First Semester. We have completed theory successfully.

Prof. S. P. Takale

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DEPARTMENT OF MICROBIOLOGY

SEMESTER III

S.Y.B.Sc.

Subject – MB – 211: MEDICAL MICROBIOLOGY AND IMMUNOLOGY

Teacher Name –Prof. P.P.Chaudhary

Month	Unit	Topics
August –2023	1	<p style="text-align: center;">MEDICAL MICROBIOLOGY</p> <p>Defination Study of following pathogens with respect to – Classification, Morphological, Cultural and Biochemical characters, Antigenic structure, Viability characteristics, Pathogenicity, Pathogenesis, Symptoms, Laboratory diagnosis, Epidemiology, Prophylaxis and Chemotherapy: Bacteria: a) <i>Escherichia coli</i> b) <i>Staphylococcus aureus</i> Fungi: a) <i>Candida</i> b) <i>Dermatophytes</i></p>
August – September 2023	2	<p>Introduction to Chemotherapy i. Selective toxicity, Bioavailability MIC, MBC, LD 50 ii. Antagonism and synergism in drug administration iii. Antibiotic sensitivity, iv. Antibiotic misuse/antibiotic overuse v. Concept of drug resistance (e.g. MRSA, ESBL)</p>

<p>September 2023</p>	<p>3</p> <p>4</p> <p>5</p>	<p>IMMUNOLOGY</p> <p>Immunity: Definition, types (Innate and acquired, active and passive, humoral and cell mediated)</p> <p>Formation of blood cells (hematopoiesis) Myeloid and lymphoid lineages and differentiation process Lymphocytes types</p> <p>Antigens and antibodies: definition and concept Immunohematology</p> <p>a. ABO and Rh blood group systems b. Bombay blood group c. Biochemistry of blood group substances d. Inheritance of ABH antigens e. Medico legal applications of blood groups</p>
<p>October 2023</p>	<p>6</p>	<p>Active and Passive Immunization</p> <p>a. Active Immunization Whole organism vaccines</p> <p>i. Attenuated vaccines ii. Inactivated Vaccines</p> <p>b. Passive Immunization Transfer of preformed antibodies</p> <p>c. Latest Immunization schedule in India</p> <p>Revision And Assignment</p>

Prof. P.P.Chaudhary

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SYLLABUS COMPLETION REPORT

A.Y. 2023-2024

SEMESTER IV

S.Y.B.Sc.

Subject –
MB-241: Bacterial Genetics

Teacher Name –Prof. A.A.Indais

Month	Unit	Topics
Janaury 2024	1	Understanding DNA: i. Experimental evidence for nucleic acid as genetic material. a. Discovery of transforming material (hereditary material): b. Griffith's experiment c. Avery and MacLeod experiment d. Gierer and Schramm e. Fraenkel-Conrat and Singer experiment (TMV virus) f. Hershey and Chase experiment

<p>Febraury 2024</p>	<p>2</p>	<p>ii. Types of nucleic acids (DNA and RNAs)</p> <p>iii. Structure of DNA</p> <p>a. Structure of Nitrogen bases, Nucleoside, Nucleotide and polynucleotide chain</p> <p>b. Bonds involved in DNA structure</p> <p>c. Different forms of DNA</p>
<p>March 2024</p>	<p>3</p>	<p>iv. Prokaryotic DNA replication</p> <p>a. Models of DNA replication (Conservative, semi-conservative and Dispersive)</p> <p>b. Meselson and Stahl’s experiment (semi-conservative)</p> <p>c. Six basic rules of DNA replication</p> <p>d. Enzymes, proteins and other factors involved in DNA replication.</p> <p>e. Modes of DNA replication Rolling circle mechanism, theta and linear DNA replication</p> <p>i. Gene expression</p> <p>a. Concept of Genetic code and its properties</p> <p>b. Concept of transcription and translation</p>
<p>April 2024</p>	<p>4</p>	<p>ii. Mutations and reversions</p> <p>Concept of Mutation and Types of mutations: Nonsense, Missense, Silent, Conditional lethal-temperature sensitive, Amber, Reverse, suppressor</p> <p>a. Spontaneous Mutation</p> <ul style="list-style-type: none"> <input type="checkbox"/> Discovery of spontaneous mutation (Fluctuation test) <input type="checkbox"/> Mechanism of spontaneous mutation <input type="checkbox"/> Isolation of Mutants: Replica plate technique

		<p>b. Concept of Induced Mutations</p> <ul style="list-style-type: none"> <input type="checkbox"/> Base pair substitution (Transitions, Transversions), Insertions and deletions-Frame / Phase shift mutations <input type="checkbox"/> Physical Mutagenic agent: UV and X-ray <input type="checkbox"/> Chemical mutagenic agents <input type="checkbox"/> Base analogues (2 amino purine, 5 bromouracil), <input type="checkbox"/> HNO₂, Alkylating agents <input type="checkbox"/> Intercalating agents (EtBr, acridine orange) <p>amino acids vitamins, minerals, water, buffers, antifoam agents, precursors, inhibitors, and inducers)</p>
April 2024	5	<p>iii. Plasmid genetics</p> <ul style="list-style-type: none"> a. Types of plasmids b. Properties of Plasmid c. Plasmid replication d. Plasmid incompatibility e. Plasmid curing f. Plasmid amplification Concept <p>Revision and assignment</p>

Prof. A.A.Indais

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A.Y. 2023-2024

SEMESTER IV

S.Y.B.Sc.

Subject –

MB – 211: MEDICAL MICROBIOLOGY AND IMMUNOLOGY

Teacher Name –Prof. M.S.Jadhav

Month	Unit	Topics
Febraury 2024	1	i. Air Microbiology a. Air flora <input type="checkbox"/> Transient nature of air flora <input type="checkbox"/> Droplet, droplet nuclei and aerosols b. Methods of Air sampling and types of air samplers <input type="checkbox"/> Impaction on solids <input type="checkbox"/> Impingement in liquid <input type="checkbox"/> Sedimentation <input type="checkbox"/> Centrifugation c. Air sanitation: Physical and chemical methods d. Airborne infections
	2	ii. Water Microbiology a. Types of water: surface, ground, stored, distilled, mineral and de-mineralized water

<p>Febraury - March 2024</p>		<p>b. Recommended Bacteriological standards of Water Quality</p> <p><input type="checkbox"/> Maharashtra Pollution Control Board (MPCB) Main Functions of MPCB</p> <p>Water quality standards for best designated usages</p> <p><input type="checkbox"/> Central Pollution Control Board (CPCB) Main Functions of CPCB</p> <p>Designated Best Use Water Quality Criteria</p> <p>c. Water purification methods</p> <p>d. Water borne Infections</p> <p>e. Indicators of faecal pollution: <i>Escherichia coli, Bifidobacterium, Streptococcus faecalis, Clostridium perfringens,</i> New indicators: <i>Campylobacter</i> and <i>Pseudomonas</i></p> <p>f. Bacteriological analysis of water for potability</p> <p>i. Bacteriological standards of potable water: Bureau of Indian standards (BIS)</p> <p>ii. World Health Organization (WHO)</p> <p>iii. Presumptive coliform count</p> <p>iv. Confirmed test</p> <p>v. Completed test</p> <p>vi. Eijkman test</p> <p>vii. Membrane filter technique</p>
<p>March -April 2024</p>	<p>3</p>	<p>Soil Microbiology</p> <p>a. Rhizosphere microflora and its role in the rhizosphere</p> <p>b. Role of microorganisms in composting and humus formation</p> <p>c. Biofertilizers: Bacterial, Cyanobacterial, fungal and their large-scale production</p> <p>d. Biocontrol agents: Bacterial, Viral, Fungal and their large-scale production</p> <p>e. Brief account of microbial interactions: Symbiosis, Neutralism, Commensalism, Competition, Ammensalism, Synergism, Parasitism and Predation</p> <p>f. Role of microorganisms in elemental cycles in nature: Carbon, Nitrogen</p> <p>Revision and assignment</p>

Prof. M.S.Jadhav