

SEMESTER-VI, PAPER – I

FOOD AND INDUSTRIAL MICROBIOLOGY, Hours : 50

sl no	Topics	Hrs	STAFF
	Part A – Food Microbiology		25 hrs
1	Food and Microorganisms : Food as a substrate for microorganisms, sources of contamination of food.	02	MP
2	Food Spoilage and Poisoning: Spoilage of canned foods, cereals, fruits, vegetables. Meat and fish, food sanitation and control. Food poisoning: Endotoxin. Staphylococcal poisoning. Botulism and Salmonellosis. Mycotoxins produced by Fungi: Aflatoxins in stored food and grains	08	
3	Fermented Foods : Idli. butter milk and yoghurt, cheese and Kefir.	04	
4	Food Preservation: Principles of food preservation, physical (Heating and Freezing) and chemical (Sodium benzoate, Citric acid) methods	04	
5	Microbiology of Milk: Sources of milk contamination, Methods to detect microbial spoilage by SPC. Reductase test. Biochemical changes of milk souring. Gassy fermentation. Proteolysis. Lipolysis. Ropiness, Phosphatase test, Clot on boiling test. Starter culture and its role	05	
6	Methods of Preservation of Milk and Milk Products: Pasteurization and sterilization – Tetra Packing.	02	
	PART B: INDUSTRIAL MICROBIOLOGY		25hr
1	Isolation and screening of industrially important microorganisms	02	AS
2	Strain improvement methods.	02	
3	Fermentation Technology; Types of industrial fermentation process Principles of Batch, Continuous, surface, submerged and solid state fermentation.	02	
4	Media components and formulation: Crude media components, anti-foam agents, precursors, inducers. Inhibitors and buffering agents.	02	
5	Sterilization of media and raw materials and maintenance of sterility at critical points during fermentation	02	
6	Inoculum preparation, Immobilization of cells and Enzymes	02	
7	Process parameters: Aeration, Agitation, Temperature regulation, Foam regulation and pH Regulation	02	
8	Fermentors : Basic structure, construction and various types - Typical stirred aerated fermentor. Tower fermentor and Bubble cap fermentor.	02	
9	Down stream processing : Precipitation, filtration, centrifugation. distillation, cell disruption, solvent recovery, drying, crystallization	02	
10	Industrial production of chemicals: Alcohol, lactic acid, penicillin, Cephalosporin, protease and Insulin	05	
11	Role of microorganisms for production and recovery of minerals and petroleum	02	

PRACTICAL Paper I

1. Isolation and identification of microbes from infected fruits, vegetables and cereals.
2. Isolation and identification of microorganisms from curd, idli, butter and stored foods —jams, jellies, sauce and pickles.
3. Bacterial examination of milk by SPC and DMC methods.
4. Methylene Blue Reduction test (MBRT) for quality assessment of milk.
5. Estimation of fat content in milk by Gerber's method.
6. Estimation of lactose in milk.
7. Estimation of Lactic acid from curd samples.
8. Observations of industrially important microorganisms.
9. Production of Wine from grapes/Industrial yeast culturing.
10. Estimation of alcohol content.
11. Preparation of banana juice by pectinase.
12. Production and estimation of citric acid by titrimetric method.
13. Study of different types of fermentation (charts).

Note: Visit to Industries / Research laboratories. Dairy industries. Distilleries, Pharmaceuticals and pathological laboratories. A report on the visit should be written and submitted along with practical record.

SEMESTER-VI, PAPER - II
Immunology and Medical Microbiology, Hours : 50

PART A : IMMUNOLOGY			25hrs
1	History and scope of Immunology	02	AS
2	Immune response : CMI, MHC AMI. Immunological memory and immunological tolerance.	03	
3	Immunity : Types - Natural, Acquired, Active and Passive	02	
4	Antigens : Nature and types, Factors influencing antigenicity	02	
5	Antibodies : Structure, types, properties and functions of immunoglobulins.	02	KH
6	Antigen and Antibody reactions : Agglutination, Precipitation, Complement fixation test, Neutralization test, Opsonization. Gel-diffusion techniques, Immuno electrophoresis , Labelled Antibodies – RIA , ELISA, Immuno fluorescent techniques.	06	
7	Complement system : Properties, components, pathways and functions	02	MP
8	Cells, tissues and organs involved in immune system.	02	
9	Hypersensitivity : Type- I, Type- II, Type- III and Type- IV	02	
10	Vaccines Types and significance	02	
PART B : MEDICAL MICROBIOLOGY			25hrs
1	History and development of medical microbiology. Normal flora of human body	02	KH
2	Infection : Types, Modes of transmission, port of entry	02	
3	Pathogenesis : Virulence - Attenuation and exaltation with an example each.	02	
4	Microbial disease of Humans Morphology, cultural and biochemical characteristics, Classification, resistance, pathogenesis, clinical symptoms, laboratory diagnosis, epidemiology, prophylaxis and treatment of the following. a. Bacterial diseases -Tuberculosis and Typhoid b. Viral diseases – Hepatitis and AIDS. c. Fungal diseases -Candidiosis, Dermatomycosis d. Protozoan diseases - Malaria. And amoebiosis	12	
5	Antibiotics: General characteristics and types of antibiotics, mode of action of penicillin, streptomycin, and chloramphenicol. Resistance	03	
6	Recent trends in Diagnostics	02	
7	Introduction and applications of Bioinformatics and Nanotechnology	02	

PRACTICAL 6.4 - IMMUNOLOGY AND MEDICAL MICROBIOLOGY

1. Isolation and identification of microorganisms from ear, nose, throat and sputum (Growth on blood agar, chocolate agar, Baird parker, MacConkey agar, Nutrient agar).
2. Isolation and identification of microorganisms from clinical samples - urine (Growth in alkaline peptone water, blood agar, mackonkey agar)
 - a) Semi quantitative estimation of C+V
 - b) Chemical analysis of urine - crystal identification, determination of sugar and protein.
3. Blood grouping and calculation of allelic frequencies.
4. Differential count of WBC
5. Coagulase test.
6. WIDAL test
7. VDRL test
8. Spot ELISA
9. ODD-Ouchterlony Double diffusion.
10. Study of AFB (Acid Fast Bacteria)
11. Study of pathogenic microorganisms-slides.