

4264 - FOOD MICROBIOLOGY										
Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)					
Lectures	Practical	Credits			Theory		Practical Ex.		Total	
2	4	6	25	25	3Hrs	100	50		200	
Pre-requisite		Source	Semester	Theory		Test	Total	TW	PR	Gr Total
4262		FOD		75	25	100	50	50	200	

Rationale: A technician in the food industry is involved in processing, preserving and storing foods in a wholesome manner. Adequate knowledge of the micro-organisms commonly found in foods and their effect on them is therefore essential. This course is designed to give the student sufficient knowledge of food groups in general of common food micro-organisms, their role in processing and spoilage, toxin formation and infection. Special attention has been given to the importance of microbiological standards and adequate laboratory techniques used in detection/enumeration and identification of organism from various food groups.

COURSE CONTENT		Hrs	Mks
1. MICRO-ORGANISM IN FOOD		8	16
Classification as spoilage, pathogenic beneficial and inert organisms. Factors affecting microbial growth in foods: Moisture, temperature, pH, oxidation, reduction potential, type of food, and presence of inhibitory substances. Groups and genera of bacteria playing significant role in foods, proteolytic, saccharolytic, lipolytic, pectolytic, halophilic, thermophilic and psychrophilic. Introduction to bacterial taxonomy gram positive and gram negative bacteria.			
2. ROLE OF MICRO - ORGANISMS IN FOOD		6	14
Spoilage of various foods: Causes, sources and effect of spoilage. Action on carbohydrates, nitrogenous compounds and lipids. Production of toxins and infections. Processing of foods: Standard organisms involved and the biochemical changes brought about during processing of bread, idli, pickles, curds, cheese, butter, wine, beer and vinegar.			
3. FOOD POISONING, AND PREVENTION		4	14
Types of food poisonings – Chemical, biological, bacterial and fungal. Bacterial toxins of Clostridium botulinum, Clostridium perfringens: Characteristics of the toxin, symptoms caused and preventive measures. Mycotoxins, different fungi producing toxins, characteristics of aflatoxin, symptoms caused and preventive measures. Prevention of food poisoning: Pest control, waste disposal and hygienic condition.			

4. FOOD BORN INFECTIONS	2	10
Micro-organisms causing infections: Salmonella, Shigella, E. Coli, Streptococci, Vibrio, Bacillus, Proteus, Klebsella and Mycobacterium. Diseases caused, their symptoms and preventive measures: Dysentery, typhoid, cholera, tuberculosis, brucellosis and parasitic worms.		
5. MICROBIOLOGICAL DETERIORATION OF SPECIFIC FOODS	8	32
Natural flora, sources of contamination, types of spoilage, principles of preservation methods used, quality standards required and various specific tests for following foods: Cereal and cereal products, sugar and sugar products, fruits and vegetables, meat and meat product, fish and fish products, poultry and eggs, milk and milk products, miscellaneous foods – oil, spices, condiments, etc.		
6. DIFFERENT TESTS	4	14
Principles and procedures of standard laboratory test used- for detection /estimation of microbial flora in various foods. Sampling methods, total plate counts, selective media, direct microscopic counts. Test for pathogens: Salmonella, Staphylococcus and biochemical tests for identification of bacteria.		
Total	32	100

PRACTICALS

- 1) Total plate count of the given samples- Raw and pasteurised milk. Spices.
- 2) Total yeast count in tomato ketchup / squash / fruit juice.
- 3) Total mould count in tomato ketchup /jams /pickles /spices.
- 4) Preparation and use of selective media. Detection of coliforms in milk samples.
- 5) Direct microscope counts of yeast by- Simple staining methods- Differential staining for living and dead cells; Haemocytometer slide.
- 6) Isolation and identification of bacterial cultures (standard cultures available in the laboratory)

Gram positive	Bacillus, Staphylococcus, Streptococcus and Micrococcus
Gram negative	E. Coli, Salmonella, Pseudomonas and Serratia.
- 7) Study of amylolytic, lipolytic, proteolytic activity of the above cultures.
- 8) Total counts of mesophilic, thermophilic and psychrophilic bacteria in the given samples.
- 9) Test for phosphatase in pasteurised and unpasteurised milk.
- 10) Methylene blue reduction test and Resazurin reduction test of milk samples.
- 11) Examination of canned foods- External examination, total plate count, identification of the contaminant.
- 12) Sampling methods for microbial analysis handling of samples- Meat- TPC, Fish-TPC.

REFERENCE BOOKS

1. Food Microbiology by W. C. Frazier
2. Microbiological Method by C. H. Collins & P.M. Lyne.
3. Food Microbiology by James Jay
4. Medical Microbiology by Cruickshank
5. Society of America bacteriologist Manual of Microbiological Methods
6. Harrigan and Mc Cance.

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