

19FT202 FOOD MICROBIOLOGY

Hours Per Week :

L	T	P	C
3	-	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	-	30	25	55	-	-	5	5



Source:

<http://old.matis.is/english/emphasis/food-safety-and-environment/microbiology>

COURSE DESCRIPTION AND OBJECTIVES:

This course deals with basics of food microbiology, preservation and spoilage of various food products. The objective of this course is to enable students to apply, identification and enumeration techniques of microbes found in food products.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Apply the knowledge of morphology and staining techniques to identify various micro-organisms.	1, 2
2	Analyse the cause of food spoilage and to formulate list of precaution to avoid spoilage.	4, 5
3	Design preservation conditions based on various intrinsic and extrinsic properties of food.	2, 3
4	Investigate the impact of environmental hurdles to control microbial growth.	4
5	Use the principle of canning to avoid spoilage by pathogenic bacteria.	1,3
6	Development of fermented food and apply the potential of beneficial microbes for health promotion.	4

SKILLS:

- ✓ *Prepare and sterilize media.*
- ✓ *Identify types of microorganisms present in food products.*
- ✓ *Prepare pure cultures of microbes.*
- ✓ *Isolate microorganisms from the food sample.*

UNIT - I**L-9**

INTRODUCTION TO FOOD MICROBIOLOGY : History of food microbiology; Moulds-general characteristic of moulds, classification and identification of moulds; Yeasts and yeast like fungi-general characteristics of yeasts, classification and identification of yeasts, yeasts of industrial importance; Bacteria-Morphological characteristics important in food bacteriology; Morphology of bacteria-yeast, mold and actinomycetes, spores and vegetative cells, gram-staining.

UNIT - II**L-9**

FOOD SPOILAGE : Cause and spoilage-microbial spoilage of foods, cause of spoilage, classification of foods by ease of spoilage, factors affecting different types and number of microorganisms in food; Factors affecting growth and survival of microorganisms in foods-growth curve, serial dilution technique, contamination of food, sources of contamination; Food spoilage-spoilage microorganisms in different food products including milk, fish, meat, egg, cereals and their products.

UNIT - III**L-9**

FOOD PRESERVATION : Intrinsic factors-nutrient content, pH, buffering capacity, redox potential, inhibitory substances and biological structures (Antimicrobial barriers and constituents) water activity; Extrinsic factors-relative humidity, temperature and gaseous atmosphere; Methods of food preservation-high temperature, low temperature, drying, irradiation, chemical preservatives, bio-preservatives, hurdle technology, active packaging, novel food processing technologies.

UNIT - IV**L-9**

FOOD BORNE INTOXICATION AND DISEASES : Intoxication and diseases from microbes-pathogens and non-pathogens including Staphylococcus, Salmonella, Shigella, Escherichia, Bacillus, Clostridium, and Aspergillus genera; Microbiology of canned foods-causes of spoilage, appearance of the unopened container, types of biological spoilage of canned foods, flat sour spoilage, TA spoilage, sulphide spoilage.

UNIT - V**L-9**

ROLE OF BENEFICIAL MICROBES IN FOOD INDUSTRIES: Fermented dairy products-bacteria used in yoghurt making, bacteria and fungi used in cheese making; Fermented vegetables-sauerkraut, pickles, fermented alcoholic beverages, acetic acid fermentation; Oriental fermented foods-soy sauce, miso, tempeh, ang-khak, natto, tofu, idli; Micro-organism as a food-single cell protein, probiotics, production of amino-acids, production of enzymes, production of other substances added to foods- dextran, lactic acid, citric acid.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS

TOTAL HOURS: 30

1. Introduction to different types of equipment used in food Microbiology Lab.
2. Preparation and sterilization of media.
3. Gram staining and microscopic examination of bacteria.
4. Techniques of pure culture (Pour plate and streak plate).
5. Isolation and Identification of molds from foods.
6. Microbial examination of milk.
7. To perform MBRT for milk.
8. Microbial examination of fruits and vegetable products – Isolation, Identification.
9. Microbial examination of Fermented food – Isolation, Identification.
10. Determination of effect of various preservatives on the suppression of microbial growth.
11. preparation of fermented food products.
12. Microbial examination of cereal and cereal products.
13. Canning of fresh fruits and vegetables and understanding the principles.
14. Enumeration and isolation of anaerobic bacteria in food products.
15. Industrial visit and report preparation.

TEXT BOOKS:

1. W. C. Frazier and D. C. Westhoff, "Food Microbiology", 4th edition, Tata McGraw Hills Publishing Company Limited, 2004.
2. J. M. Jay, "Modern Food Microbiology", 4th edition, Springer, 2000.

REFERENCE BOOKS:

1. J. Garbutt, "Essentials of Food Microbiology", 2nd edition, Taylor and Francis, 1997.
2. M. J. Pelczar, E. C. S. Chan and N. R. Krieg, "Microbiology", 5th edition, Tata McGraw-Hill Education Pvt. Ltd, 1998.
3. S.J. Forsythe, "Microbiology of Safe Food", 2nd edition, Blackwell Publishing Limited, 2010