

## **GENERIC ELECTIVE COURSE**

### **GE FT04- Microbes in Food and Food Safety**

## **CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Lecture	Tutorial	Practical		
Microbes in Food and Food Safety	4	3	0	1	Grade XII Pass	

## Learning Objectives

1. To understand the important genera of microorganisms associated with food and their characteristics.
2. To understand the role of microbes in fermentation, spoilage and food borne diseases.
3. To understand the principles of food preservation.
4. To understand Food safety , types of hazards associated with food and current regulatory regime along with food safety management systems.

## Learning Outcomes

1. Acquaint the knowledge of the important genera of microorganisms associated with food and their characteristics.
2. Able to explain the role of microbes in fermentation, spoilage and food borne diseases and their role in food preservation
3. Understand Food safety and types of hazards associated with food
4. Introduction to current Food Regulatory regime and Food Safety Management Systems.

## SYLLABUS

## **THEORY**

## **Unit I: Introduction to Food Microbiology**

10 Hours

Covers genera of microorganisms associated with food and their characteristic features , growth pattern and enumeration

- Definition and Scope of food microbiology
- Types of Microorganisms in food (bacteria, fungi and viruses )
- Sources of Microorganisms in foods
- Bacterial growth curve, Factors affecting the growth of micro- organisms in food

- Enumeration of microorganisms

**Unit II: Role of microorganisms in Food and their control** **15 Hours**

Role of microbes in fermentation, spoilage and food borne diseases is the focus of this unit along with food preservation principles and techniques (

- Food Spoilage , Spoilage in different food types
- Beneficial Role of Microorganisms -Microorganisms used in food fermentations, Common Fermented Foods
- Food borne diseases and types – food infections, food borne intoxications and toxin infections
- Principles of Food preservation and common methods used in food industry, Effect of preservation methods such as thermal processing, freezing and irradiation on microbes
- Introduction to Novel Techniques of Food Preservation- HHP,PEF, Ohmic heating, Microwaves etc. and Hurdle Technology

**Unit III: Food Safety and Regulations** **10 Hours**

Covers food safety , types of hazards associated with food , current regulatory regime and

- Food safety: Definition, Types of hazards, biological, chemical, physical hazards and allergens
- Food Safety Management Tools: GHP, HACCP and ISO series
- National Regulatory Regime
- International Regulatory bodies

**PRACTICAL**  
**(Credit 1; Hours 30)**

- Introduction to the Basic Microbiology Laboratory Practices and equipments used in a microbiology laboratory-autoclave , laminar air flow chamber, incubators, hot air oven ,colony counter
- Cleaning and sterilization of glassware
- Working and handling of a compound microscope
- Simple staining
- Gram's staining
- Preparation and sterilization of culture media
- Standard Plate Count Method
- Bacteriological Analysis of Water using MPN method

**Essential Readings**

1. Forsythe, S J. (1987) Microbiology of Safe Food. USA: Blackwell Science, Oxford, 2000 65 & Sons.
2. Frazier, William C. and Westhoff, Dennis C. (2004).Food Microbiology. New Delhi: TMH.
3. Garbutt, John.(1997). Essentials of Food Microbiology. London: Arnold.
4. Jay, James M. (2000). Modern Food Microbiology. New Delhi: CBS Publication.

### **Suggested Readings**

1. De Vries. (1997). Food Safety and Toxicity. New York: CRC.
2. Lawley, R., Curtis L. and Davis, J. (2004). The Food Safety Hazard Guidebook. RSC Publishing.
3. Marriott, Norman G. (1985). Principles of Food Sanitation. New York: AVI.
4. Pelczar, M.J., Chan E.C.S and Krieg, Noel. R. (1993) Microbiology, 5th Ed. New Delhi: TMH
5. Mathur, P. (2018). Food Safety and Quality Control. Hyderabad: Orient Black Swan Pvt. Ltd.