

## DEPARTMENT OF HOME SCIENCE

### SEMESTER 5

#### B.Sc. Hons (Food Technology)

#### DISCIPLINE SPECIFIC CORE COURSE

#### DSC FT13: Food Microbiology

#### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITE OF THE COURSE

Course title & code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course (if any)
		Theory	Tutorial	Practical/Practice		
Food Microbiology	4	3	0	1	XII Pass with PCM/PCB	Nil

#### Learning Objectives

- To know the important genera of microorganisms associated with food and their characteristics.
- To understand the role of microbes in fermentation, spoilage and food borne diseases.

#### Learning Outcomes

Upon completion of this course, students are expected to:

- Recognize and describe the characteristics of important pathogens and spoilage microorganisms in foods.
- Understand the role and significance of intrinsic and extrinsic factors on growth and response of microorganisms in foods.
- Identify ways to control microorganisms in foods.
- Identify the conditions under which the important pathogens and spoilage microorganisms are commonly inactivated, killed or made harmless in foods.
- Describe the beneficial role of microorganisms in fermented foods and in food processing.
- 6. Utilize laboratory techniques to detect, quantify, and identify microorganisms in foods.

- Acquire, discover, and apply the theories and principles of food microbiology in practical, real-world situations and problems.
- Develop success skills in communication, critical thinking, interaction, information acquisition and interpretation and life-long-learning.

## **SYLLABUS OF DSC FT13**

### **THEORY** **Credits: 3; Hours: 45**

#### **UNIT I: Microorganisms in food**

**15 Hours**

Unit Description: The unit shall introduce students to the world of food microbiology. The structure and growth of bacteria, yeast, mold and virus in food as well as how the intrinsic and extrinsic factors affect the growth of microorganisms shall be taken up. The growth curve of bacteria will be covered to understand various phases of growth.

##### *Subtopics:*

- Introduction, history and scope of food microbiology.
- Morphological and physiological features of bacteria, yeast, mold. Introduction to bacterial endospores and capsules. Food borne viruses and their reproduction.
- Growth curve of bacteria.
- Factors affecting growth of microbes in foods.
- Role of microorganism in fermentation, spoilage and food borne diseases.

#### **UNIT II: Cultivation of microorganism**

**10 Hours**

Unit Description: Isolation and cultivation is the heart of microbiology. Therefore, the various techniques related to their cultivation and enumeration shall be taught. Although some are already taken in practicals but not all of them. A theoretical insight is needed.

##### *Subtopics:*

- Principles of cultivation of microorganism (purity, activity etc.).
- Pure culture technique.
- Methods of isolation and enumeration (including latest ones).
- Rapid methods of bacteria detection.

#### **UNIT III: Microbial food spoilage**

**10 Hours**

Unit Description: Food is the best substrate for the microorganism to grow, multiply and cause undesirable changes. The spoilage of raw as well as processed foods is very common. Therefore, as a food processor the understanding of food spoilage is very important for the students, in order to preserve the food.

##### *Subtopics:*

- Sources of microorganism in foods.
- Spoilage in milk, meat, cereals, fruits and vegetables (and few associated products).
- Spoilage in canned foods.

#### **UNIT IV: Food preservation by novel technologies**

**10 Hours**

Unit Description: There are many convention and new methods of food preservation. The novel methods cause minimum changes in sensory and nutritive properties of food. It is imperative to teach such methods and their application in food preservation.

*Subtopics:*

- Conventional methods of food preservation- an overview.
- Non-thermal methods such as pulse electric field preservation, high hydrostatic pressure, ohmic heating, irradiation, biopreservation etc. to be familiarized.
- Hurdle concept and minimal processing.

**PRACTICAL**  
**Credit: 1; Hours: 30**

1. Introduction to the Basic Microbiology Laboratory Practices and Equipment's
2. Functioning and use of compound microscope
3. Cleaning and sterilization of glassware
4. Preparation and sterilization of nutrient broth
5. Preparation of slant, stab and plates using nutrient agar
6. Cultivation and sub-culturing of microbes
7. Morphological study of bacteria and fungi using permanent slides
8. Simple staining
9. Gram's staining
10. Standard Plate Count Method

**Essential Readings**

- Frazier William C and Westhoff, Dennis C. Food Microbiology, TMH, New Delhi, 2004
- Jay, James M. Modern Food Microbiology, CBS Publication, New Delhi, 2000
- Garbutt, John. Essentials of Food Microbiology, Arnold, London, 1997
- Pelczar MJ, Chan E.C.S and Krieg, Noel R. Microbiology, 5th Ed., TMH, New Delhi, 1993
- W. M. Foster (2020) Food Microbiology. CBS Publishers & Distributors Pvt Ltd.

**Suggested Readings**

- Bibek Ray and Arun Bhunia. Fundamentals food microbiology, 5<sup>th</sup> Ed, CRC Press, 2014.
- K.R. Aneja. Experiments in microbiology, plant pathology, tissue culture and microbial biotechnology, New age international publishers, 2018.
- Roger Y. Stanier. General Microbiology, Macmillan, 1987.
- K.R. Aneja. Modern Food Microbiology, Medtech, 2018

**Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.**