

**B.A. (Prog) with Food Technology (FT) as Major & Non-Major**  
**Pool DSE: Even Semester**

**DISCIPLINE SPECIFIC ELECTIVE COURSE – DSE-8 –FT:  
 APPLIED FOOD MICROBIOLOGY**

**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/ Practice		
Applied Food Microbiology	4	3	0	1	Class XII	Nil

**LEARNING OBJECTIVES:**

- To provide students with a comprehensive understanding of food microbiology, including the applications of various microorganisms in food product development and potential sources of food spoilage.
- To equip students with practical skills in microbiological techniques, such as microbial cultivation, staining, and enumeration.

**LEARNING OUTCOMES:**

After completion of the course the students will be able to -

- Understand the role of microorganisms in food industry
- Analyse microbial growth and growth factors.
- Understand the microbial spoilage and their contribution to the occurrence of foodborne diseases
- Understand the beneficial role of microorganism along with food product development.

**SYLLABUS OF DSE -8 -FT**

**THEORY**

**(Credits: 3; Hours: 45)**

**UNIT I: Microorganisms in Food**

**10 Hours**

*Unit Description:* This unit provides an overview of applied food microbiology, focusing on the role of microorganisms in food systems. It explores the classification, types, and morphology of microorganisms commonly associated with foods, including bacteria, fungi, and viruses. The unit also examines the various sources from which microorganisms can enter food.

*Subtopics:*

- Introduction and scope of applied food microbiology.
- Classification and types of microorganisms (bacteria, fungi and viruses) in foods and their morphology.
- Sources of microorganisms in foods.

**UNIT II: Growth and Cultivation of Microorganism****10 Hours**

*Unit Description:* This unit delves into the dynamics of microbial growth in food systems, focusing on the bacterial growth curve and the various factors that influence the growth of microorganisms in foods. It also provides a comprehensive understanding of the techniques used for cultivating and enumerating microorganisms.

*Subtopics:*

- Bacterial growth curve and factors affecting growth of microorganisms in foods
- Techniques for cultivation of microorganisms
- Enumeration of microorganisms

**UNIT III: Role of Microorganisms in Food: Spoilage and Diseases****12 Hours**

*Unit Description:* This unit examines the role of microorganisms in food systems, with a focus on their involvement in food spoilage and their contribution to the occurrence of foodborne diseases.

*Subtopics:*

- Food microbial spoilage
- Spoilage in different food types (milk, meat, fruits and vegetables)
- Food borne diseases and types, food borne intoxications, infection and food borne toxic infections

**UNIT IV: Application of Microorganisms in Food Development and Preservation 13 Hours**

*Unit Description:* This unit offers a comprehensive insight into the beneficial roles of microorganisms in food production and preservation.

*Subtopics:*

- Type and role of microorganisms in development of: probiotic foods (yoghurt, curd), fermented food (bread, beer, wine, cheese, vinegar)
- Role of microorganism in food preservation (pickling, sauerkraut, kimchi)
- Role of microorganisms in enzyme production

**PRACTICAL****(Credit: 1; Hours: 30)***No. of Students per Practical Class Group: 10-15*

1. Introduction to the Basic Microbiology Laboratory Practices and Equipments
2. Functioning and handling of microscope
3. Morphological study of bacteria using permanent slides
4. Morphological study of fungi using permanent slides

5. Simple staining /Gram's staining
6. Cleaning and sterilization of glassware
7. Preparation and sterilization of culture media (nutrient agar/ nutrient broth)
8. Standard Plate Count Method for bacteria
9. Standard Plate Count Method for fungi

#### **ESSENTIAL/ RECOMMENDED READINGS (Theory and Practical):**

- Frazier William C and Westhoff, Dennis C. (2004) Food Microbiology, TMH, New Delhi,
- Jay, James M. Modern (2000) Food Microbiology, CBS Publication, New Delhi.
- Pelczar MJ, Chan E.C.S and Krieg, Noel R. (1993) Microbiology, 5th Ed., TMH, New Delhi.
- W. M. Foster. (2020) Food Microbiology. CBS Publishers & Distributors Pvt Ltd.
- Nehra, M., & Nain, V. (2024). Handbook of Industrial Food Microbiology. CRC Press.

#### **SUGGESTED READINGS:**

- Bibek Ray and Arun Bhunia. (2014) Fundamentals food microbiology, 5th Ed, CRC Press.
- K.R. Aneja. (2018) Experiments in microbiology, plant pathology, tissue culture and microbial biotechnology, New age international publishers.
- Roger Y. Stanier. (1987) General Microbiology, Macmillan.
- K.R. Aneja. (2018) Modern Food Microbiology, Medtech.
- Kieliszek, M., & Kowalczewski, P. L. (2023). Recent Advances in Applied Microbiology and Food Sciences (p. 218). MDPI-Multidisciplinary Digital Publishing Institute.
- Reddy, S. M., Girisham, S., & Babu, G. N. (2017). Applied Microbiology (agriculture, environmental, food and industrial microbiology). Scientific Publishers.
- Garbutt, John. (1997) Essentials of Food Microbiology, Arnold, London.

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