

**Model Syllabus for Food Science and Technology (Minor) in consonance
with Curriculum framework w.e.f. AY 2026-27**

COURSE STRUCTURE

Year	Semester	Course	Title of the Course	No. of Hrs /Week	No. of Credits
II	IV	2	Food Microbiology	3	3
			Food Microbiology-Practical	2	1

SEMESTER-IV

COURSE 2: FOOD MICROBIOLOGY

Theory

Credits: 3

3 hrs/week

Learning Objectives

To introduce the fundamental concepts of food microbiology.

Learning Outcomes

Upon successful completion of the course, a student will be able to:

LO1: To understand about scope of microbiology & classification of micro organisms & sterilization methods.

LO2: To study about the prokaryotic cells like bacteria, yeast, molds & viruses which are associated with food.

LO3: To learn about physical & chemical factors affecting growth of micro

organisms. LO4: To understand about metabolism & growth of micro organisms.

LO5: To study bacterial genetics & mutation.

UNIT – I

Historical aspects, Scope of microbiology, General classification of microorganisms, morphology, Structure and function of prokaryotic cells and their organelles – Structure and function of eukaryotic cells and their organelles morphological and biochemical characteristics of important groups.

UNIT – II

Characteristics of growth and reproduction. Physical and chemical factors affecting growth of microorganisms like temperature, pH, oxygen, Osmotic pressure, nutrients etc, bacteriostatic and bactericidal. Physiology, Nutritional requirement of bacteria, yeast and fungi, bacterial growth curve.

UNIT – III

Microorganisms associated with foods, Sources of microorganisms – Soil, water, plants and of animal origin. Useful microorganisms –Endospore formers, Irregular non-sporing gram positive rods. Yeasts & molds their role in food spoilage, Estimating number of microorganisms, sampling, sample size. Aseptic collection of samples, total cell counts and viable cell counts, plate counters. Indicator organisms. Alternative and Rapid methods for detection of specific microbes and toxins : Dye-reduction tests, Electrical methods, ATP determination –Pure cultures-preparation, maintenance and preservation – Microbiological quality control and HACCP

UNIT – IV

Microbiology of Food commodities, Contamination, preservation and spoilage & beneficial role of microorganisms in Cereals, Pulses, Nuts and Oilseeds, Fruits and Fruit products ,Vegetables and Vegetable products Meat , dairy and their products. Microbiology of water- Contamination and microbial standards.

UNIT V

Food preservation Heat processing: Pasteurization and appertization, Determination of D and z values. Heat sensitivity of micro-organisms & Spoilage of canned foods. Aseptic packaging, Irradiation Brief account of microwave, UV and ionizing radiation. Brief account of High pressure processing Low temperature storage Chilling and freezing. Effect of chemical and natural preservatives on microbes in food.

REFERENCES:

1. General microbiology Pelzar –
2. Food Microbiology Frazier
3. Molecular biology of the Cell Bruce Alberts
4. Cell and molecular biology De Robertis & De Robertis
5. W.C.Frazier: *Food Microbiology (IV edition)* McGraw Hill Book Company, New York (1995)
6. James M Jay: *Modern food microbiology IV edition*, CBS publishers, New Delhi (1996)

7. M.R. Adams and M.O. Moss, *Food Microbiology*, Second Edition, Panima Publishing corporation, New Delhi. Third reprint 2004.
8. Gustavo F Gutierrez-Lopez, Gustavo V Barbosa-Canovas *Food Science and Food Biotechnology*: CRCPress 2003
9. Bibek Ray: *Fundamental Food Microbiology*, (Third Edition) CRC Press December 2003

SEMESTER-IV

COURSE 2: FOOD MICROBIOLOGY

Practical	Credits: 1	2 hrs/week
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|----|---|
| 1. | Identification of microbes by Simple staining |
| 2. | Identification of microbes by Gram staining |
| 3. | Microbial mobility test (hanging drop method) |
| 4. | Determination of size of microbes (micrometry) |
| 5. | Direct microscopic count (DMC) of microorganisms |
| 6. | Identification of common microorganisms. |
| 7. | Identification of fungi in bread, pickles, jam, groundnut etc. |
| 8. | Microbiological examination of fresh fruits, vegetables and spices. |

4- Year UG Honours MINOR

Syllabus

(2026-27)

Semester- IV

Model Question Paper

Time : 3hrs

Marks:75

Part-A

Answer any Five Questions. Each Question carries 3 Marks.

5x3=15

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Answer the following questions. Each question carries 12 Marks

5x12=60

11. a) Unit-I
(Or)
b) Unit-I

12. a) Unit-II
(Or)
b) Unit-II

13. a) Unit-III
(Or)
b) Unit-III

14. a) Unit-IV
(Or)
b) Unit-IV

15. a) Unit-V
(Or)
b) Unit-V