



# SRI VENKATESHWARA UNIVERSITY

## TIRUPATI

### Model Syllabus for 4-Year UG Honours in B.Sc. (Food Science and Technology) as Major in consonance with Curriculum framework w.e.f. AY 2025-26

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#### COURSE STRUCTURE

| Year | Semester | Course | Title of the Course                                   | No. of Hrs /Week | No. of Credits |
|------|----------|--------|-------------------------------------------------------|------------------|----------------|
| I    | I        | 1      | Introduction to Food Science and Technology           | 3                | 3              |
|      |          |        | Introduction to Food Science and Technology-Practical | 2                | 1              |
|      |          | 2      | Human Nutrition                                       | 3                | 3              |
|      |          |        | Human Nutrition-Practical                             | 2                | 1              |
|      | II       | 3      | Food Microbiology                                     | 3                | 3              |
|      |          |        | Food Microbiology-Practical                           | 2                | 1              |
|      |          | 4      | Basic principles of Food Engineering                  | 3                | 3              |
|      |          |        | Basic principles of Food Engineering-Practical        | 2                | 1              |
| II   | III      | 5      | Technology of Fats and Oils                           | 3                | 3              |
|      |          |        | Technology of Fats and Oils-Practical                 | 2                | 1              |
|      |          | 6      | Dairy Technology                                      | 3                | 3              |
|      |          |        | Dairy Technology-Practical                            | 2                | 1              |
|      |          | 7      | Confectionery Technology                              | 3                | 3              |
|      |          |        | Confectionery Technology-Practical                    | 2                | 1              |
|      | IV       | 8      | Baking Science and Technology                         | 3                | 3              |
|      |          |        | Baking Science and Technology-Practical               | 2                | 1              |
|      |          | 9      | Technology of Fruits and Vegetables                   | 3                | 3              |
|      |          |        | Technology of Fruits and Vegetables-Practical         | 2                | 1              |
|      |          | 10     | Technology of Cereals, Pulses and oil seeds           | 3                | 3              |
|      |          |        | Technology of Cereals, Pulses and oil seeds-Practical | 2                | 1              |
| III  | V        | 11     | Food Safety and Quality Control                       | 3                | 3              |
|      |          |        | Food Safety and Quality Control-Practical             | 2                | 1              |

|    |     |      |                                                                   |   |   |
|----|-----|------|-------------------------------------------------------------------|---|---|
|    |     |      |                                                                   |   |   |
|    |     | 12 A | Technology of meat, poultry and fish products                     | 3 | 3 |
|    |     |      | Technology of meat, poultry and fish products-Practical           | 2 | 1 |
|    |     | OR   |                                                                   |   |   |
|    |     | 12 B | Post-harvest technology of horticulture crops and herbs           | 3 | 3 |
|    |     |      | Post-harvest technology of horticulture crops and herbs-Practical | 2 | 1 |
|    |     |      |                                                                   |   |   |
|    |     | 13 A | Unit operations in food industry                                  | 3 | 3 |
|    |     |      | Unit operations in food industry-Practical                        | 2 | 1 |
|    |     | OR   |                                                                   |   |   |
|    |     | 13 B | Fermentation Technology                                           | 3 | 3 |
|    |     |      | Fermentation Technology-Practical                                 | 2 | 1 |
|    |     |      |                                                                   |   |   |
|    | VI  | 14 A | Food Processing and Preservation Technology                       | 3 | 3 |
|    |     |      | Food Processing and Preservation Technology-Practical             | 2 | 1 |
|    |     | OR   |                                                                   |   |   |
|    |     | 14 B | Food Fortification                                                | 3 | 3 |
|    |     |      | Food Fortification-Practical                                      | 2 | 1 |
|    |     |      |                                                                   |   |   |
|    |     | 15 A | Processing Technology of Beverages                                | 3 | 3 |
|    |     |      | Processing Technology of Beverages-Practical                      | 2 | 1 |
|    |     | OR   |                                                                   |   |   |
|    |     | 15 B | Food Packaging Technology                                         | 3 | 3 |
|    |     |      | Food Packaging Technology-Practical                               | 2 | 1 |
|    |     |      |                                                                   |   |   |
| IV | VII | 16   | Enzymes in Food Processing Industry                               | 3 | 3 |
|    |     |      | Enzymes in Food Processing Industry-Practical                     | 2 | 1 |
|    |     | 17   | Nutraceuticals and Functional foods                               | 3 | 3 |
|    |     |      | Nutraceuticals and Functional foods-Practical                     | 2 | 1 |
|    |     | 18   | Fundamentals of Food Chemistry                                    | 3 | 3 |
|    |     |      | Fundamentals of Food Chemistry-Practical                          | 2 | 1 |
|    |     |      |                                                                   |   |   |
|    |     | 19 A | Food Product development and entrepreneurship                     | 3 | 3 |
|    |     |      | Food Product development and entrepreneurship-Practical           | 2 | 1 |
|    |     | OR   |                                                                   |   |   |

|  |             |             |                                                                      |          |          |
|--|-------------|-------------|----------------------------------------------------------------------|----------|----------|
|  |             | <b>19 B</b> | Food waste management and by- product utilization                    | <b>3</b> | <b>3</b> |
|  |             |             | Food waste management and by- product utilization-Practical          | <b>2</b> | <b>1</b> |
|  |             |             |                                                                      |          |          |
|  |             | <b>20 A</b> | Research Methodology and Scientific writing of papers                | <b>3</b> | <b>3</b> |
|  |             |             | Research Methodology and Scientific writing of papers-Practical      | <b>2</b> | <b>1</b> |
|  |             | <b>OR</b>   |                                                                      |          |          |
|  |             | <b>20 B</b> | Computational biology and ICT in Food industry                       | <b>3</b> | <b>3</b> |
|  |             |             | Computational biology and ICT in Food industry-Practical             | <b>2</b> | <b>1</b> |
|  | <b>VIII</b> | <b>21</b>   | Food Biotechnology and nano- technology                              | <b>3</b> | <b>3</b> |
|  |             |             | Food Biotechnology and nano- technology-Practical                    | <b>2</b> | <b>1</b> |
|  |             | <b>22</b>   | Industrial Microbiology                                              | <b>3</b> | <b>3</b> |
|  |             |             | Industrial Microbiology-Practical                                    | <b>2</b> | <b>1</b> |
|  |             | <b>23</b>   | Instrumentation in Food Analysis                                     | <b>3</b> | <b>3</b> |
|  |             |             | Instrumentation in Food Analysis-Practical                           | <b>2</b> | <b>1</b> |
|  |             |             |                                                                      |          |          |
|  |             | <b>24 A</b> | Food Toxicology                                                      | <b>3</b> | <b>3</b> |
|  |             |             | Food Toxicology-Practical                                            | <b>2</b> | <b>1</b> |
|  |             | <b>OR</b>   |                                                                      |          |          |
|  |             | <b>24 B</b> | Basics in Immunology, Food Allergy and Food borne diseases           | <b>3</b> | <b>3</b> |
|  |             |             | Basics in Immunology, Food Allergy and Food borne diseases-Practical | <b>2</b> | <b>1</b> |
|  |             |             |                                                                      |          |          |
|  |             | <b>25 A</b> | Snack Food Extrusion Technology                                      | <b>3</b> | <b>3</b> |
|  |             |             | Snack Food Extrusion Technology-Practical                            | <b>2</b> | <b>1</b> |
|  |             | <b>OR</b>   |                                                                      |          |          |
|  |             | <b>25 B</b> | Technology of Spices, condiments and plantation crops                | <b>3</b> | <b>3</b> |
|  |             |             | Technology of Spices, condiments and plantation crops-Practical      | <b>2</b> | <b>1</b> |

**Note:** In the III Year (during the V and VI Semesters), students are required to select a pair of electives from one of the Three specified domains. For example: if set 'A' is chosen, courses 12 to 15 to be chosen as 12 A, 13 A, 14 A and 15 A. To ensure in-depth understanding and skill development in the chosen domain, students must continue with the same domain electives in both the V and VI Semesters.

## SEMESTER - II

### COURSE 3: FOOD MICROBIOLOGY

Theory

Credits: 3

3 hrs/week

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#### Learning Objectives

To introduce the fundamental concepts of 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. Brief survey of microbes as friends and foes. Characteristics, growth and reproduction, Sterilization and disinfections.

#### 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. Structure of DNA, Types of RNA and difference between DNA & RNA.

### 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 - II

### COURSE 3: FOOD MICROBIOLOGY

| Practical | Credits: 1 | 2 hrs/week |
|-----------|------------|------------|
|-----------|------------|------------|

- 
- |     |                                                                                            |
|-----|--------------------------------------------------------------------------------------------|
| 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.                        |
| 9.  | Microbiological examination of canned foods (acidic and non-acidic foods)                  |
| 10. | Microbiological examination of bottled and aseptically packed beverages                    |
| a.  | water (MPN method for determination of coliform count)                                     |
| 11. | Microbiological examination of flour, bread, cakes, sugar and cocoa confectionery products |
| 12. | Microbiological examination of meat, milk and their products                               |
| 13. | Visit to food microbiology lab.                                                            |

**4- Year UG Honours, Major  
Syllabus  
(2025-26)  
Semester-II**

**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