Department of Home Science
Semester -IV
B.A. (Prog) with Food Technology (FT) as Major
Category-II

DISCIPLINE SPECIFIC CORE COURSE – DSC-7-FT:
INTRODUCTION TO 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/ Practice		
Introduction to Food Safety	4	3	0	1	Class XII	NIL

LEARNING OBJECTIVES:

1. To impart knowledge on basic concepts of food safety.
2. To familiarize the students about common physical, chemical and biological contamination of food.
3. To help students understand the basics of surveillance and sustainability in food processing.

LEARNING OUTCOMES:

After completion of the course, the students will be able to:
1. Explain food safety, principles of hygiene and factors which compromise food safety
2. Appreciate the role of surveillance and sustainability while ensuring food safety
3. Handle food with responsibility
4. Facilitate safe food handling by fellow colleagues in food processing unit

SYLLABUS OF DSC-7-FT

THEORY
(Credits 3: 45 Hours)

UNIT I: Unit I: Introduction to Food Safety (15 Hours)

- *Unit Description:* This unit will introduce the students to the concept of food safety and hygiene as well as safety related challenges faced while ensuring processing and handling of food.
- *Subtopics:*
  - Importance of food safety and key terms
  - Factors affecting food safety
  - Emerging concerns of food safety
  - General principles of food hygiene

UNIT III: Biological Hazards in Foods: Microorganisms, Spoilage and its Prevention (14 Hours)

- *Unit Description:* This unit will help students learn and understand how different types of micro organisms can cause food spoilage which can lead to food poisoning and intoxication to the consumer.
- *Subtopics:*
    - Food hazards of biological origin- bacteria, mold, yeast, viruses and parasites
    - Factors affecting microbial growth in foods.
    - Types of food spoilage, causes and prevention (canned food, milk, water, nuts)
    - Food borne diseases- food infections and food intoxications.
    - Mycotoxins and other toxins produced in foods.

UNIT II: Physical and Chemical Contaminants in Foods (8 Hours)

- *Unit Description:* Contamination is an important cause of unsafe food. In this unit salient physical and chemical contaminants shall be discussed in detail. Secondary contamination shall also be dealt briefly.
- *Subtopics:*
    - Following contaminants and hazards in food and water:
        - Physical Hazards
        - Heavy Metals
        - Pesticide Residues
        - Veterinary Drug Residues
        - Packaging Residues
    - Secondary contamination

Unit IV: National Food Laws and Sustainability (8 Hours)

- *Unit Description:* Governance at national level for ensuring food safety from farm to the consumer's plate will be discussed in this unit. It will also introduce the concept that ensuring food safety is a responsibility which should not compromise the environment.
- *Subtopics:*
    - FSS Act and Regulations (1, 4, 5,7, 13)
    - Consumer Protection Act, 1986
    - Sustainable Hygiene Practices
    - Green Food Processing

PRACTICAL
(Credits 1: 30 Hours)

No. of Students per Practical Class Group: 10-15

1. Develop a checklist on food hygiene practices.
2. Conduct a survey to study the food hygiene practices in a food processing unit.
3. Develop educational aid on general principles of hygiene as recommended by WHO.
4. College Project by a group of students to maintain good hygiene in college canteen
   OR
   Conduct a food laboratory waste segregation activity by students and demonstration of food waste compost making unit.
5. Identification and removal of physical hazards rice grains, tea leaves, whole wheat flour and pulses.

6. Assessing the pH, TDS and hardness of potable water.
7. Checking the spoilage in milk by making use of MBRT method.
8. Assessing the microbial count by swab method for the workers and cooking surface areas of college canteen.
9. Identification of microbes/parasites by use of prepared slides and specimens.

ESSENTIAL READINGS (Theory and Practical):

- Suri, S and Malhotra, A. (2014). *Food Science, Nutrition and Safety*. Dorling Kindersley Pvt. Ltd. (Pearson) India.
- Mathur, P. (2018). *Food Safety and Quality Control*. Orient Blackswan Private Limited.
- *The Food Safety and Standards Act along with Rules and Regulations*. (2011) Delhi: Commercial Law Publishers (India) Pvt. Ltd.
- Frazier, W.C. and Westhoff, D.C. (2014). *Food Microbiology*. Chennai: Tata McGrawHill Publishing Company Limited.
- Srivastava, S.S. (2006). *Phal Parirakshan*. Lucknow: Kitab Mahal.

SUGGESTED READINGS:

- Boye, J.I. and Arcand, Y. (2012). *Green Technologies in Production and Processing*. First Edition. Springer Nature (USA).
- Kapoor, B., Singh, R., Kapoor, D. and Gautam, V. (2022). *Environmental Sustainability in Food Industry: A Green Perspective*. First Edition. CRC Press (USA).
- Knechtges, L.I. (2012). *Food Safety-Theory and Practice*, USA: Jones and Barlette Learning.

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

DISCIPLINE SPECIFIC CORE COURSE – DSC-8-FT: BASIC PRESERVATION TECHNOLOGY

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		
Basic Preservation Technology	4	3	0	1	Class XII	Nil

LEARNING OBJECTIVES:

1. To familiarize the students with food spoilage and their causes.
2. To impart basic knowledge related to principles of food preservation.

3. To introduce the students about applications of food preservation.
4. To develop the skills of processing of chutney, sauces, fruit beverages and pickles.

LEARNING OUTCOMES:

After completion of the course, the students will be able to:

1. Describe the purpose and scope of food preservation in Indian economy
2. Explain the different objectives, principles and methods of food preservation
3. Develop safe and hygienic fruits and vegetable-based products like chutneys, sauces, beverages and pickles

SYLLABUS OF DSC-8-FT

THEORY
(Credits 3: 45 Hours)

UNIT I: Scope of Food Preservation (6 Hours)

- *Unit Description:* This introductory unit focuses on the scope of food preservation and the objectives of food preservation and processing.
- *Subtopics:*
    - Scope of preservation industry in India
    - Objectives of preservation and processing

UNIT II: Spoilage in Preserved Products (9 Hours)

- *Unit Description:* This unit will lay emphasis on types of food spoilage in different food products as well as factors affecting food spoilage. This unit will also describe various contaminants that can result in food contamination.
- *Subtopics:*
    - Food spoilage and types
    - Causes of spoilage
    - Spoilage in different food products
    - Food contamination

UNIT III: Principles and Methods of Preservation (15 Hours)

- *Unit Description:* This unit will comprise of basic principles and various popular food preservation methods based on these principles.
- *Subtopics:*
    - Basic principles of food preservation
    - Basic Methods of preservation
        - Asepsis
        - Use of low temperature
        - Use of high temperature
        - Removal of moisture
        - Removal of air
        - Use of preservatives
        - Fermentation (Modification of pH)

- Irradiation
- Gas preservation
- Combination of Methods – Hurdle Technology
- Novel Preservation Techniques (HPP, PEF, Ohmic Heating, Irradiation - nomenclature only)

UNIT IV: Basic Fruit and Vegetable Preserved Products (15 Hours)

- *Unit Description:*This unit will describe the preservation methods of different fruits and vegetables based processed products.
- *Subtopics:*
  - Definition, classification, preparation steps and method of preservation of following:
  - Chutneys
  - Sauces
  - Fruit beverages (with special emphasis on pasteurization, use of chemical preservatives, sugar)
  - Pickles

PRACTICAL
(Credits 1: 30 Hours)

No. of Students per Practical Class Group: 10-15

1. Sterilization of bottles.
2. Market survey of preserved fruit and vegetable products
3. Development of an educational aid on food labelling
4. Preparation, bottling, sensory/objective (TSS, pH) evaluation and costing & Labelling of:
   - Sauces (chilli sauce and tomato sauce)
   - Ketchup (tomato)
   - Chutney (tomato chutney and *imli* chutney)
   - Squash (lemon squash/ orange squash, pineapple squash)
   - Syrup (rose syrup and almond syrup)
   - Fermented beverage (*Kanji*)/ value added beverages
   - Pickles (Lime, Mix Vegetable, Chilli)

ESSENTIAL READINGS (Theory and Practical):

- Rao, E.S., Garg, M. and Barwa, M.S.(2023). *Handbook on Processing and Preservation of Fruits and Vegetables.* 2nd edn. Variety Books Publisher's Distributors, New Delhi
- Frazier, W.C. and Westhoff, D.C. (2014). *Food Microbiology*. Chennai: Tata McGraw Hill Publishing Company Limited.
- Fellows, P.J. (2022). *Food Processing Technology Principles and Practice* (5th ed.). Woodhead Publishing Series in Food Science, Technology and Nutrition. https://doi.org/10.1016/C2019-0-04416-0.
- Rahman, M.S. (Ed.). (2020). *Handbook of Food Preservation* (3rd ed.). CRC Press. https://doi.org/10.1201/9780429091483
- Suri, S. & Malhotra, A. (2014). *Food Science Nutrition and Safety*. Delhi: Pearson India Ltd.
- Sivasankar, B. (2002). *Food Quality, in Food Processing and Preservation*. Prentice-Hall of India Private Limited, New Delhi.
- Srivastava, S.S. (2006). *Phal Parirakshan*. Lucknow: Kitab Mahal.

SUGGESTED READINGS:

- Potter, N.N., and Hotchkiss, J.H. (2012). Food Science (5th ed.). Springer New York, NY. XV, 608. https://doi.org/10.1007/978-1-4615-4985-7.
- Lal, G., Siddhapa, G.S. and Tandon, G.L. (2009). *Preservation of Fruits and Vegetables*. New Delhi: Indian Council of Agriculture Research.
- Subbalakshmi, G., and Udipi, S.A. (2007). *Food Processing and Preservation*. Delhi: New Age International Publishers.
- Khurdia, D.S. (1995). *Preservation of fruits and vegetables*. New Delhi: Indian Council of Agriculture Research.

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