

Bachelors in Arts with With Community Science
Category-V

**DISCIPLINE SPECIFIC ELECTIVE COURSE – DSE-FN 4-HSC:
FRUIT AND VEGETABLE PRESERVATION**

CREDIT DISTRIBUTION, ELIGIBILITY, PRE-REQUISITES OF THE COURSE

Course Title & Code	Credits	Credit distribution of the course			Eligibility Criteria	Prerequisite of the course
		Lecture	Tutorial	Practical		
Fruit and Vegetable Preservation	4	2	0	2	-	NIL

Learning Objectives

- To familiarize the students with food spoilage and their causes.
- To impart basic knowledge related to principles of food preservation and techniques.
- To introduce the students to applications of food preservation.
- To develop skills of processing, packaging, labelling and evaluating various fruits and vegetables based preserved products.

Learning Outcomes

The students would be able to:

- Describe the principles and methods of fruit and vegetable preservation and processing.
- Prepare safe and hygienic fruits and vegetable-based products like sauces, beverages, pickles, jams, jelly, dehydrated vegetables and preserves.

THEORY
(Credits 2; Hours 30)

UNIT I: Introduction and Principles of Preservation

05 Hours

This introductory unit focuses on the objectives of food preservation and processing and basic principles and various popular food preservation methods based on these principles.

- Define Food preservation, Processing,
- Food spoilage: type and causes
- Objectives of preservation and processing
- Basic principles of food preservation

UNIT II: Basic Methods of Preservation

10 Hours

This unit focuses on popular food preservation methods based on principles of preservation.

- Asepsis
- Use of low temperature
- Use of high temperature
- Removal of moisture (Aw)
- Removal of air

- Use of preservatives
- Fermentation
- Irradiation
- Gas preservation
- Combination of methods- hurdle technology

UNIT III: Basic Fruit and Vegetable Preserved Products

05 Hours

This unit will describe the preservation methods of different fruits and vegetables based processed products.

- Definition, FSSAI specifications, classification, preparation steps and method of preservation of following:
- Sauces and Chutneys
- Fruit beverages (with special emphasis on pasteurization, use of chemical preservatives, sugar)
- Pickles

UNIT IV: Fruit and Vegetable Processing –Pectin Products, and Preserves 10 Hours

This unit will focus on the processing of jam, jelly, marmalades and preserves.

- Jam, Jelly and Marmalade- definition and FSSAI specifications, role of pectin and theory of gel formation, method of preservation, steps of preparation and evaluation of jam, jelly and marmalade
- Preserves- definition of candied, crystallized and glazed fruits, principle of preservation, steps of preparation and evaluation of preserve.

PRACTICAL (Credits 2; Hours 60)

1. Sterilization of bottles.
2. Preparation, bottling, labelling and sensory/objective evaluation (TSS, pH) of:
 - Sauces (chilli sauce and tomato sauce/ ketchup)
 - Chutney (tomato chutney and imli chutney)
 - Squash (lemon squash/ orange squash, pineapple squash)
 - Syrup (rose syrup and almond syrup)
 - Pickles (Lime, Mix Vegetable, Chilli)
 - Jam (apple jam / mixed fruit jam)
 - Jelly (guava jelly)
 - Preserve (carrot)
 - Dehydration of vegetables (green leafy vegetables, other vegetables and tubers)
3. Preparing any of the preserved product/new product in bulk and organizing an exhibition-cum-sale.

Essential Readings

UNIT I

This unit defines food preservation and spoilage, exploring core principles—to extend shelf life, ensure safety, and maintain nutritional quality.

- **Suri, S. & Malhotra, A.** (2014). *Food Science Nutrition and Safety*. Delhi: Pearson India Ltd.

- **Mathur, P.** (2018). *Food Safety and Quality Control*. Orient Black Swan Pvt. Ltd.
- **Srilakshmi, B.** (2026). *Food Science*. (9th Ed.). Delhi: New Age Publications.

UNIT II

This unit focuses on popular methods of food preservation and its principles.

- **Suri, S. & Malhotra, A.** (2014). *Food Science Nutrition and Safety*. Delhi: Pearson India Ltd.
- **Mathur, P.** (2018). *Food Safety and Quality Control*. Orient Black Swan Pvt. Ltd.
- **Srilakshmi, B.** (2026). *Food Science*. (9th Ed.). Delhi: New Age Publications.

UNIT III

This unit defines FSSAI specifications and preparation methods for sauces, chutneys, beverages, and pickles, highlighting preservation techniques such as pasteurization, acidification, and the strategic use of chemical preservatives and sugar.

- **Rao, E.S., Garg, M. and Barwa, M.S.** (2023). *Handbook on Processing and Preservation of Fruits and Vegetables*. (2nd Ed.) Variety Books Publisher's Distributors, New Delhi
- **Lal, G., Siddhapa, G.S., and Tandon, G.L.** (2009). *Preservation of Fruits and Vegetables*. New Delhi: Indian Council of Agriculture Research.
- **Srivastava, S.S.** (2006). *Phal Parirakshan*. Lucknow: Kitab Mahal.

UNIT IV

This unit covers the preparation and FSSAI standards for jam, jelly, and marmalades, detailing pectin-sugar-acid gel chemistry, alongside the principles of sugar-based preservation for candied, crystallized, and glazed fruit products.

- **Khurdia, D.S.** (1995). *Preservation of Fruits and Vegetables*. New Delhi: Indian Council of Agriculture Research.
- **Board, N. P. C. S.** (2012). *Modern Technology on Food Preservation*. Asia Pacific Business Press Inc.
- **Goyal, MR., Mishra, S.K., and Birwal, P.** (2022). *Food Processing and Preservation Technologies – advances, methods and applications*. New York: Apple Academic Press.

Suggested Readings

- **Potter, N., and Hotchkiss, J.H.** (2006). *Food Science*. Delhi: CBS Publishers.
- **Hui, Y.H., and Evaranuz, E.O.** (2015). *Handbook of Vegetable Processing and Preservation*. 2nd Edition. USA: CRC Press.
- **Sharma, S.** (2010). *Post-harvest Management and Processing of Fruits and Vegetables*: Instant Notes. New India Publishing Agency.
- **Ramaswamy, H. and Marcotte, M.** (2009). *Food Processing–Principles and Applications*. Boca Raton: Taylor and Francis.
- **Subbalakshmi, G. and Udipi, S.A.** (2007). *Food Processing and Preservation*. Delhi: New Age International Publishers.
- **Barba, F. J., Ahrné, L., Xanthakis, E., Landerslev, M. G., and Orlén, V.** (2018). Innovative technologies for food preservation. In: *Innovative Technologies for Food Preservation* (pp. 25-51). Academic Press.

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