

**17FT001 PLANT FOOD TECHNOLOGY**

Hours Per Week :

L	T	P	C
3	1	-	4

Total Hours :

L	T	P	WA/RA	SSH/HSH	CS	SA	S	BS
45	15	-	15	30	-	5	5	-

**Course Description and Objectives:**

This course deals with technologies related to handling, processing, and storage of 'fruits and vegetables' and 'Cereal and Pulses'. The objective of this course is to impart skill and knowledge required to apply the principles and concepts behind 'fruit and vegetable' and 'cereals and pulses' processing including post-harvest handling, specific processing techniques, quality analysis and stabilizing shelf life of the products.

**Course Outcomes:**

Upon successful completion of this course student should be able to:

- Gain knowledge on processing techniques of 'fruits, vegetables, Cereal and pulses
- Know about preservation techniques to improve the shelf life of seasonal fruits
- Know the utilization of by products from fruits, vegetables, cereals and pulses

**SKILLS:**

- ✓ Identify and predicts the post harvest handling factors affecting the shelf life of fruits, vegetables, cereals and pulses
- ✓ Suggest suitable processing and storage conditions for fruits, vegetables, cereals and pulses
- ✓ Handle cereal processing equipment.

**ACTIVITY:**

- o Report on nutritional composition, processing and storage considerations for a particular fruit / vegetable product

**UNIT –I**

Production of fruits and vegetables in India. Composition of each of the major fruits and vegetables produced in the country -Mangoes, Pineapple, Guava, Papaya, Grapes among fruits - Beans, Carrot, Tomatoes, Potato, Onion, Brinjal among vegetables. Causes for heavy losses. Spoilage factors, post harvest field operations including methods to reduce the post harvest losses, General methods of preservation of fruits and vegetables. Canning of fruits and vegetables Reception, sorting and storage operations for fruit and vegetables. Preparation of fruits and vegetables for canning. – Washing, peeling, grating, slicing, dicing, deseeding, blanching - Importance of blanching operations - Batch and continuous blanching.-Hot water and steam blanching.- Canning operations – Precautions in canning operations, Spoilage of canned foods. Common machinery for operations like Peeling, Slicing/Dicing, Pulping, Grating and canning process.

**UNIT –II**

Production and preservation of fruits and vegetable juices, preservation of fruit juice by hurdle technology. Preparation of Jam, Jelly and marmalade, pickles, vinegar and tomato product. Juice and pulp extraction – various extractors used including Hydraulic Press - Hot and Cold Break processes- Clarification centrifuges – Decanters and desludgers. Processing of tea, coffee cocoa and mushroom technology.

**UNIT –III**

Specialty products - Fruit Bars, Fruit juice concentrates – methods of concentration - evaporators used for concentration of fruit juices and pulp - Tubular, Plate and scraped surface evaporators and Fruit Powders -Preparation of Fruit material for powder production - Working of Spray, Dryer and Drum Dryer – Fruit juice aroma Recovery and its importance. Brief on Aroma Recovery equipment.

**UNIT –IV**

Storage of cereals, Infestation measures; Drying of grains, Processing of rice and rice products. Milling of wheat and production of wheat products, including flour and semolina. Milling of corn, barley, oat, coarse grains including sorghum, ragi and millets. Milling of Pulses: Major Pulses grown in the country and their application, Status of Pulse milling industry in India, need for modernization, Traditional milling process - merits and demerits. Drying of legumes - Sun drying, Traditional Processing steps – Pre-cleaning, Pitting, Oil application, Conditioning, Dehusking and splitting - Machinery and equipment employed, mass balance, losses during milling. Modern milling process - Process flow chart - Mechanical hot air drying and conditioning – merits and demerits, Dehusking in Pulse Pearler, Water conditioning, splitting of pulses in Pulse splitter, Merits and demerits. Mini dhal mill – working principle - advantages and disadvantages. Grinding of split pulses, pulse, flour products, their applications, and equipment used.

**UNIT – V**

Grain Storage and Handling: Bag Storage -Advantages and Disadvantages- Bag Storage structure design. Parameters of good storage structure. Cover Plinth Storage Structures, CAP storage (Ceiling and Plinth Storage), Plans for Bag storage, lay outs, Dunnage, Materials for Dunnage, Pallets, Protection against Rodents, Fungi, Pests and Mites. Fumigation Processes for bag storage piles. Bulk Storage in silos and large bins -Problems of Silo storage, Construction of Silos - concrete and Metal Silos, Physical load and mechanical strength of Silos, Silo flow problems, Relative merits and demerits of Silo storage to Bag Storage, Conveyors and Elevators for feeding and discharging into Silos. In silo Aeration and Drying, Problems of Dust Explosion in Grain Storages, Quality Changes of Grains during storages and remedial measures to prevent unwanted quality changes.

**TEXT BOOKS:**

1. Srivastava,R.P., and Sanjeev Kumar: Fruit and vegetable preservation; principles and practices : International Book Distributing Co., Lucknow. 1998.
2. Lal, G., Siddappa, G. and Tondon G.L.: Preservation of Fruits and Vegetables, Indian Council of Agricultural Research, New Delhi. 1986.
3. A. chakraverty: Post Harvest Technology of cereals, Pulses and Oilseeds: Oxford and IBH Publishing Company Pvt. Ltd., New Delhi. 1995.

**REFERENCE BOOKS:**

1. NLKent andADEvers, "Kent's Technology of Cereals: An Introduction for students of Food Science and Agriculture", 4th Ed., Woodhead Pub. Ltd., Cambridge, UK (1994
2. Dauthy, M.E.: Fruit and Vegetable Processing. International Book Distributing Co.Lucknow, India. (1997).
3. Hamson, L.P: Commercial Processing of Vegetables. Noyes Data Corporation, New Jersey. (1975)