

GUJARAT TECHNOLOGICAL UNIVERSITY

Branch Name: Food Processing & Technology (14)

Subject Name: Horticultural Produce Processing

Subject Code: 2171407

BE Semester: 07

1) Type of Course: Food Processing Technology

2) Prerequisite: Nil

3) Rational

The subject Horticultural Produce Processing is aimed to develop an understanding in processing techniques and skills in handling equipment/machines used for preservation and value addition of perishables like fruits and vegetables.

4) Teaching Scheme & Examination Scheme

Subject Code	Subject Name	Teaching Scheme(Hours)				Credits	Theory Marks					Tutorial Work/Practical Marks					Total
		Theory	Tutorial	Practical	ESE(E)		PA (M)			Viva (V)		PA(I)					
							Passing Criteria	Other PA	ALA	Passing Criteria	Viva	OEP	Passing Criteria	Other PA	CS	Passing Criteria	
2171407	Horticultural Produce Processing	4	0	2	6	70	23/70	20	10	12/30	20	10	15/30	20	0	10/20	150

ESE = End Semester Examination

PA = Progressive Assessment

ALA = Active Learning Assignments

OEP = Open Ended Problems

CS = Case Studies

5) Learning Objectives

This subject is aimed to develop an understanding among the students on

- Morphology of fruits and vegetables, structure and composition.
- Post harvest physiology of fruits and vegetables and their handling.
- Canning and freezing technology for various fruits and vegetable to increase the shelf life of processed products.
- Processing of various fruits for juice extraction and beverage making
- Processing aspects of value added products such as puree, ketchup, jam, jelly, marmalade and different pickles.

6) Open Ended Problems

The topics taught in this subject would be useful to develop insight and application based knowledge among students

To know how to monitor the ripening process, sorting and grading of fruits and vegetables. How to optimize the pretreatments. How to select the pretreatment for particular fruits and vegetables prior to processing. How to monitor the different parameters e.g. temperature, TSS etc. while processing of value added products.

7) Content

TOPIC	SUB TOPIC	LECTURES	Module Weightage (%)
Introduction	Morphology of fruits and vegetables, structure and	03	5

	composition.		
Post harvest plant physiology	Maturity/harvesting indices, Post harvest plant processes like respiration, photosynthesis and ripening, Physicochemical changes during ripening.	09	20
Processing of fruits and vegetables by canning and freezing	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.	10	22
Squashes, Cordials and Juices	Introduction Types of squashes Extraction and preparation, flow diagrams of each storage, preservatives syrups.	08	20
Tomato Processing	Juice, concentrate, puree and ketchup.	06	12
Processing in the form of sugar base products	Jam, jellies, marmalades, preserves.	08	12
Processing by pickling	Preparation of pickles and chutneys.	06	9

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks				
Remembrance R Level	Understanding U Level	Application A Level	Analyze N Level	Evaluate E Level
20	20	18	20	22

8) Reference Books

1. Post Harvest Physiology of Perishable Plant Products. By Stanley J. Kays. C B S.
2. Preservation of Fruits and Vegetables. By Girdharilal, Sidhappa G.S. and G.L. Tondon.
3. Commercial Fruits and Vegetables Products, By Cruess W.V.
4. Technology of Juice Manufacture, By Tressler.

9) Course Outcome

At the end of this module, the student will be able to:

- a. Understand the morphology and physiology of the fruits and vegetables.
- b. Define processes employed in the manufacture of fruit and vegetable based products and beverages through construction of Process Flow Diagrams.
- c. Understand the properties of fruit and vegetable based products in terms of raw material properties, formulation, processing and storage.
- d. Identify the problems in processing of jams, jelly, marmalade, ketchup and beverages.
- e. Understand the methods to control processes.

10) List of Practicals

1. To determine quality of eggplant
2. Determine blanching adequacy of fruits and vegetables
3. Preparation of fruit jam
4. Waste index
5. Preparation
6. Preparation of fruit jelly of beverages
7. Preparation tomato ketch up
8. Preparation of fruit sauce
9. Preparation of fruit toffee
10. Preparation of fruit butter
11. Preparation of fruit cheese

11) Major Equipments

- a. Jacketed kettles
- b. Pulper

- c. Blancher
- d. SS Working tables
- e. Mixer/grinder
- f. Refrigerator
- g. Refractometers

12) List of Open Source Software/learning website

- a. www.apeda.gov.in
- b. www.fao.org/wairdocs/x5434e/x5434e05.htm
- c. [www.fruitandvegetable.ucdavis.edu/UC_Resources_for_Fruit - Vegetable Processing](http://www.fruitandvegetable.ucdavis.edu/UC_Resources_for_Fruit_-_Vegetable_Processing)
- d. www.academia.edu/.../Advances_in_minimal_processing_of_fruits_and_vegetables_a_review
- e. www.publishingindia.com/...processing...india...fruits-and-vegetable-processing.../493/