

**Department of Food Sciences**  
**University of the Punjab, Lahore**  
**Course Outline**



<b>Programme</b>	B.Sc. (Hons.) Food Science & Technology	<b>Course Code</b>	<b>FST-303</b>	<b>Credit Hours</b>	3(2-1)
<b>Course Title</b>	<b>Fruits and Vegetables Processing</b>				
<b>Course Introduction</b>					
Fruit and vegetable processing involves transforming raw produce into products with extended shelf life, improved safety, and enhanced convenience.					
<b>Learning Outcomes</b>					
On the completion of the course, the students will:					
<ul style="list-style-type: none"> <li>• Get introduced to properties of fruits and vegetables their composition and nutritional value.</li> <li>• Create awareness about reducing the post-harvest losses through processing techniques and new technologies in processing of fruits and vegetables.</li> <li>• Familiarize the students about basic manufacturing processes for squashes, syrups and fruit preserves.</li> <li>• Develop presentational skills through class participation and improve learning abilities of students with home assignments.</li> </ul>					
<b>Course Content</b>				<b>Assignments/Readings</b>	
<b>Week 1</b>	<b>Unit-I</b>				
	1.1.Fruits and vegetable processing: Introduction and explanation				
	1.2.General properties and structure				
<b>Week 2</b>	<b>Unit-II</b>				
	2.1 Processing of fruits and vegetables				
	2.2.Technologies used for processing of fruits and vegetables				
<b>Week 3</b>	<b>Unit-III</b>			Assignment topic: What is the role of Fruits and vegetables in economy of Pakistan?	
	3.1.Factors affecting post-harvest quality of fresh produce			Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.	
	3.2.Deteriorative effects on quality of fresh produce				
<b>Week 4</b>	<b>Unit-IV</b>				
	4.1 Nutritional content of fruits and vegetables				

	4.2 Quality criteria for fruits and vegetables	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
<b>Week 5</b>	<b>UNIT V</b> 5.1 Quality measurement of fresh produce	
	5.2 Maintenance of post-harvest quality of fruits and vegetables	Assignment topic: Draw and label a plant cell.
<b>Week 6</b>	<b>Unit-VI</b> 6.1. Structure of plant cell	
	6.2.Texture of plant cell	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
<b>Week 7</b>	<b>Unit-VII</b> 7.1. Spoilage Factors and their control Chemical and enzymatic.	
	7.2 Spoilage Factors and their control Biological factors	
<b>Week 8</b>	<b>Unit-VIII</b> 8.1. Preservation techniques for fresh produce	
	8.2. Preservation techniques for fresh produce	
<b>Week 9</b>	<b>Unit-IX</b> 9.1. Natural pigments in fruits and vegetables and effect of processing on them.	
	9.2 Quiz Test	
<b>Week 10</b>	<b>Unit-X</b> 10.1 Minimal Processing of fresh produce: 10.1. 1.Introduction, quality changes in MP fruits and vegetables	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
	10.2 Steps involved in MP	
<b>Week 11</b>	<b>Unit-XI</b> MAP and CA: 11.1. Introduction, working principle	Assignment topic: Compare fruit and vegetable processing industry in Pakistan to the industry of developed countries.

	11.2. Types of MAP	
<b>Week 12</b>	<b>Unit-XII</b> 12.1.High pressure processing of fresh produce	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
	12.2 Use of vacuum Technology	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
<b>Week 13</b>	<b>Unit-XIII</b> 13.1. Edible coatings	Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
	13.2 Effect of processing technologies on quality and shelflife of fresh produce	Presentation topics.
<b>Week 14</b>	<b>Unit-XIV</b> 14.1 Future trends in fruits and vegetables processing.	
	14.2 Future trends in fruits and vegetables processing.	
<b>Week 15</b>	<b>Unit-XV</b> 15.1 Organic farming	
	15.2 Quiz Test	
<b>Week 16</b>	<b>Unit-XVI</b> 16.1 Class Presentations	
	16.2 Course review	
<b>PRACTICAL</b>		
<b>Course Content</b>		<b>Assignments/Readings</b>
<b>Week 1</b>	Equipments used for fruit and vegetable preservation	Awan, J.A and Rehman, S.U. 2009. Food preservation manual. Unitech Communications, Faisalabad, Pakistan.
<b>Week 2</b>	Preparatory operations in fruit and vegetable processing and preservation	
<b>Week 3</b>	Peeling of fruits and vegetables using different methods	
<b>Week 4</b>	Size reduction of fresh produce in different shapes	

<b>Week 5</b>	Blanching	
<b>Week 6</b>	Sulphiting and sulphuring of vegetables	
<b>Week 7</b>	Canning of fruits	
<b>Week 8</b>	Dehydration of fresh produce	
<b>Week 9</b>	Freezing of vegetables	
<b>Week 10</b>	Use of chemicals to preserve fruits and vegetables	
<b>Week 11</b>	Preparation of syrups	
<b>Week 12</b>	Preparation of squash	
<b>Week 13</b>	Preparation of jams and marmalade	
<b>Week 14</b>	Preparation of tomato ketchup	
<b>Week 15</b>	Preservation of fruits and vegetables by fermentation	
<b>Week 16</b>	Preparation of pickles	

#### **Textbooks and Reading Material**

1. Awan, J.A and Rehman, S.U. 2009. Food preservation manual. Unitech Communications, Faisalabad, Pakistan.
2. Jongen, W. (Ed). 2002. Fruit and vegetable processing – improving quality. Woodhead Publishing. Ltd., Abington, Cambridge, UK.
3. Sirivastava, R.P. and Sanjeev, K. 2002. Fruit and vegetable preservation: principles and practices. International Book Distributing Co., Lucknow, India.
4. Dauthy, M.E. 1995. Fruit and vegetable processing. FAO Agricultural Services Bulletin No. 119. Food and Agriculture Organization of the United Nations, Rome, Italy.

#### **Teaching Learning Strategies**

1. White board and markers
2. Slide projector or multimedia
3. Overhead projector
4. Photocopy machine or photocopying facilities
5. Reference books
6. Journals
7. Internet (web sited literature)

#### **Assignments: Types and Number with Calendar**

- What is the role of Fruits and vegetables in economy of Pakistan?
- Compare fruit and vegetable processing industry in Pakistan to the industry of developed countries.
- Draw and label a plant cell.

<b>Assessment</b>			
<b>Sr. No.</b>	<b>Elements</b>	<b>Weightage</b>	<b>Details</b>
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.