



L	T	P/S	SW/ FW	TOTAL CREDIT UNITS
4	0	2	0	05

**Course Title: ADVANCED FRUITS AND VEGETABLES TECHNOLOGY**

**Course Code**

**Credit Units: 04**

**Course Objectives:**

This course will provide each student with an exposure about present scenario of fruits and vegetable processing industry, post-harvest handling and transportation of fresh fruits and vegetables; thermal processing, freezing, radiation processing and other methods of processing and processed fruit and vegetable products and by-product utilization of fruits and vegetable industry

**Prerequisites:**

Fundamental understanding and knowledge of various food processing techniques

**Student Learning Outcomes:**

- Use food processing technique to develop different fruits and vegetables products
- Define the lab scale methods for preparation of fruits and vegetables products
- Explain the principles behind preservation of fruits and vegetables based on water activity

**Pedagogy for Course Delivery:**

The course pedagogy will include lectures and practice sessions on the topics covered.

**Course Contents/Syllabus:**

	Weightage (%)
<b>Module I: Introduction</b>	<b>05%</b>
<ul style="list-style-type: none"> <li>• Current status of production and processing of fruits and vegetables</li> <li>• Structural, compositional and nutritional aspects of fruits and vegetables</li> <li>• Post harvest handling, transport and storage of fruits and vegetables</li> </ul>	
<b>Module II: Preservation of Fruits and vegetable by drying</b>	<b>10%</b>
<ul style="list-style-type: none"> <li>• Basic principles of preservation, process of drying of fruits and vegetable</li> <li>• Driers and their uses, factors affecting drying rate</li> <li>• Effect of drying on quality of fruits and vegetables and their products</li> <li>• Osmotic drying</li> </ul>	
<b>Module III: Preservation of Fruits and vegetable by freezing</b>	<b>10%</b>
<ul style="list-style-type: none"> <li>• Basic Principle of freezing</li> <li>• Methods for freezing, Process for freezing fruits and vegetables</li> <li>• Factors affecting freezing rate</li> <li>• Effect of freezing process on quality of frozen products</li> <li>• Dehydro-freezing process.</li> </ul>	
<b>Module IV: Technology of Canning</b>	<b>15%</b>
<ul style="list-style-type: none"> <li>• Process for canning of fruits and vegetables, Types of containers for packing</li> <li>• Flow sheets of canning of various fruits and vegetables</li> <li>• Influence of canning and bottling on nutritive value of canned products</li> <li>• Spoilage of canned products</li> <li>• Specifications for canned fruits and vegetable.</li> </ul>	
<b>Module V: Beverages</b>	<b>15%</b>
<ul style="list-style-type: none"> <li>• Classification, Technology of beverages: carbonated and non-carbonated beverages</li> <li>• Fruit beverages; juice extraction equipments; vegetable juices</li> <li>• Other miscellaneous beverages, specifications for beverages</li> </ul>	

<b>Module VI: Technology of Chutneys</b>	<ul style="list-style-type: none"> <li>Technologies for preparation of thick and thin sauces, chutneys and pickles</li> <li>Process flow sheets for preparation of sauces, chutney and pickle from typical fruits and vegetables</li> <li>Common defects of products and their control</li> <li>Specifications for chutneys, pickles and sauces.</li> </ul>	15%
<b>Module VII: Technology of High Sugar products</b>		
<ul style="list-style-type: none"> <li>Principles of jam, jelly and marmalade making, processing of jams</li> <li>Jellies &amp; marmalades, extraction of pectin, Theories of jelly formation</li> <li>Problems in jam, jelly and marmalade making</li> <li>Processing of preserves and candies</li> <li>Specifications for high sugar products.</li> </ul>	15%	
<b>Module VIII: Technology of Tomato and Tomato Products</b>	<ul style="list-style-type: none"> <li>Preparation of tomatoes for processing, methods of pulping</li> <li>Technologies for preparation of tomato juice, soup, sauce/ ketchup and other tomato products</li> <li>Common defects of tomato products and their quality control</li> <li>Specifications for tomato and tomato products.</li> </ul>	10%
<b>Module IX: By-Product Utilization</b>		
<ul style="list-style-type: none"> <li>Byproduct utilization of fruits and vegetable industry</li> </ul>	5%	

**List of experiments:**

- Assessment of the adequacy of blanching
- Study of canning operations for fruits and vegetable processing.
- Preservation of fruits and vegetables by pickling
- Preparation of tomato products- tomato sauce / ketchup and its quality evaluation
- Technologies to prepare nectars/squashes/ready-to-serve beverages and its quality evaluation
- Preservation of fruits and vegetables using high concentration of sugar
- Dehydration of fruits / vegetables and their quality evaluation
- Freezing of fruits / vegetables and their quality evaluation
- Visit to fruit and vegetable processing industry

**Assessment/ Examination Scheme:**

Theory L/T (%)	Lab/Practical/Studio (%)	End Term Examination(%)
80	20	100

**Assessment/ Examination Scheme:**

	Continuous Assessment/		Internal	End Examination	Term		Total	
	CT	S/V/Q			HA	A		EE
<b>Theory Assessment</b>	CT	S/V/Q	HA	A	EE		TT	
Weightage (%)	10	08	07	05	70		100	
<b>Practical Assessment</b>	LR	P	V/Q/P	A	WT	V	P	TP
Weightage (%)	10	10	05	05	20	20	30	100

**Abbreviations:**

CT – Class Test, S- Seminar, V- Viva, Q- Quiz, HA- Home Assignment, TT- Total Theory

LR- Lab record, WT- Written Test, P – Performance, TP- Total Practical

The total marks (out of 100) shall be the weighted average of TT and TP in the ratio of theory and lab credit units, say 3:1.

**Text & References:**

- Lal G, Siddappa GS & Tandon GL. 1998. Preservation of Fruits and Vegetables. ICAR
- Luh BS and Woodroof JG. Commercial Preservation of Vegetables. The AVI Pub. Co. Westport, USA
- Woodroof JG and Luh BS. Commercial Preservation of Fruits. The AVI Pub. Co. Westport, USA
- Srivastava, R.P. and Kumar, S. 1998. Fruit and Vegetable Preservation: Principles and Practices. 2nd Ed. International Book Distributing Co. Lucknow.
- Ryall, AL and Lipton WJ. Handling, storage and transportation of Fruits & Vegetables. Vol I & II. The AVI Pub. Company