

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI

1	Name of Syllabus	C. C. IN BASIC FOOD PROCESSING (FRUIT & VEGETABLE) (401206)																																																													
2	Max.Nos of Student	25 Students																																																													
3	Duration	1 year																																																													
4	Type	Part Time																																																													
5	Nos Of Days / Week	6 Days																																																													
6	Nos Of Hours /Days	4 hrs.																																																													
7	Space Required	1) Workshop = 300 sqfeet 2) Class Room = 200 sqfeet TOTAL = 500 sqfeet																																																													
8	Entry Qualification	S.S.C. Appeared																																																													
9	Objective Of Syllabus/ introduction	1) Learn the principles of food preservation. 2) Reduce food spoilage and avoid food borne illness by using the principle of personal hygiene and sanitation. 3) Different methods of food preservation. 4) Study of different preserved products like chutney, pickle, sauces, jams etc. 5) Raw materials for preparation of preserved products. 6) Equipments commonly used in food processing industry. 7) Use of different food preservation.																																																													
10	Employment Opportunity	1) Responsible for purchase of quality raw materials. 2) Responsible for the various processes involved in production. 3) Responsible for maintaining quality standards as per F.P.O. specification. 4) Responsible for maintaining hygiene conditions in the unit. 5) Responsible for basic maintenance and safety measures involved in the use of equipment and machinery.																																																													
11	Teacher's Qualification	B Tech (Food Technology) in Second Class with minimum one year Teaching / Industrial experience. Or B Sc. (Microbiology or chemistry) in second class and certificate course in food preservation with minimum one year relevant Industrial experience. Or B Sc. (Microbiology or chemistry) in second class with minimum two years relevant Industrial experience.																																																													
12	Training System	<table><tr><th colspan="3">Training System Per Week</th></tr><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>6hrs</td><td>18hrs</td><td>24hrs</td></tr></table>							Training System Per Week			Theory	Practical	Total	6hrs	18hrs	24hrs																																														
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13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Mini. Marks</th></tr><tr><td>1</td><td>40120611</td><td>Basic Food Processing & Packing</td><td>TH-I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>40120612</td><td>Methods of Preservation & Marketing</td><td>TH-II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>40120613</td><td>Fruits & Vegetable Preservation</td><td>TH-III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>40120621</td><td>Basic Processing</td><td>PR-I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>40120622</td><td>Fruit Products</td><td>PR-II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>40120623</td><td>Fruits & Vegetable Beverages</td><td>PR-III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>	Sr. No.	Paper Code	Name of Subject	TH/PR	Hours	Max. Marks	Mini. Marks	1	40120611	Basic Food Processing & Packing	TH-I	3 hrs.	100	35	2	40120612	Methods of Preservation & Marketing	TH-II	3 hrs.	100	35	3	40120613	Fruits & Vegetable Preservation	TH-III	3 hrs.	100	35	4	40120621	Basic Processing	PR-I	3 hrs.	100	50	5	40120622	Fruit Products	PR-II	3 hrs.	100	50	6	40120623	Fruits & Vegetable Beverages	PR-III	3 hrs.	100	50			Total			600	255					
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SYLLABUS :- BASIC FOOD PROCESSING (FRUIT & VEGETABLE)**Theory I Basic Food Processing & Packing**

Sr. No.	Topic	Sub Topic
1.	Fruits & Vegetable Processing industry	a) Information. b) Importance c) Scope
2.	Setting up of food processing Unit	a) Selection of site b) Raw material availability c) Transport facilities. d) Labour availability
3.	Harvesting & Selection of Fruits & Vegetables	a) Harvesting of fruits and vegetables b) Structure & composition of fruits & vegetables c) Selection of fruits and vegetables for processing d) Pre-harvest & post-harvest changes in fruits & vegetables
4	Food Packaging	a) Different types of containers & packaging materials b) Advantages of packaging c) Characteristics, advantages and disadvantages of different packaging materials

Theory II - Methods of Preservation & Marketing

5	Principles & methods of Fruits & Vegetable Preservation	a) Asepsis b) Use of high temperature, Retorting, Pasteurizations b) Use of low temperature c) Drying e) Use of preservatives (Class I & Class II) f) Use of high percentage of sugar g) Use of high percentage of salt h) Creating anaerobic conditions eg. Canning d) Use of radiation
6	F.P.O. (Fruit Products order)	a) Introduction to F.P.O. b) Importance & necessity of F.P.O. c) Rules & Regulations e) F.P.O. specifications for different fruit & vegetable products
7	Marketing	a) What is marketing? b) The core concepts of marketing - Needs, wants & Demands - Products - Value & satisfaction - Exchange & transaction - Markets c) Market segmentation targeting & position d) Concept of a product life cycle e) Advertising & Sales Promotion

Theory III Fruits & Vegetable Preservation

8	Tomato Products	a) Different types of tomato products e.g. 1) Tomato Juice 2) Tomato Puree 3) Tomato Paste 4) Tomato Ketchup/Sauce 5) Tomato Soap b) Method of preparation of above products. c) F.P.O. specifications for above mentioned products. d) Information about equipments needed to make the above mentioned products
9.	Jame, Jellies and Marmalades	a) Definitions of the products b) Difference between them c) Principles of preservation of these products d) Role of sugar, pectin and avoid in their preparation. e) Types of pectio substances f) Role of pectin and factors affecting gel formation g) Different defects in the product, their causes & remedies h) Equipment – brief description & sources
10.	Fruit Preserves, Candles & Cheese	a) Definition b) Principles of preparation c) Methods of preparation of commercially important products
11	Fruits and Vegetables Beverages	a) Different types of beverages b) F.P.O. specifications for different types of beverages c) Methods of preparation of 1) Squashes 2) Cordials 3) Barley water 4) Ginger Cootalls 5) Syrups 6) Crushes 7) Nectars 8) Ready to serve Beverages d) Equipment – brief description, sources

Sr. No.	Topic	Sub-Topic
1.	Pickles, Sauces and Chutneys	a) Definition b) Classification & types of pickles, chutneys & sauces c) Principles of preservation d) Different types of Spoilages, their causes & control description, sources
2.	Vinegar Preparation	a) Definition b) Types of Vinegar c) Principle of preparation d) Names of the Equipment

3.	Drying & Dehydration	a) Definition b) Advantages of this method c) Principle of preservation d) Different types of dryers e) List of some commercially important dries products & names of the equipment used to dry them
4.	Canning & Bottling	a) Principle of Preservation b) Different types of containers & their uses c) Different steps involved in canning process and their brief description
	1) Utilization of fruit & vegetable waste 2) Preparation of byproducts from waste	

Practical - I Basic Processing

Sr.No.	Practical
1.	Study of post-harvest changes in fruits & vegetables
2.	Peeling of fruits & vegetables and calculating percentage wastage
3.	Blanching of fruits & vegetables
4.	Preparation of brine & sugar syrup
5.	Use of refractometer to read the brix of the product.
6.	Preparation of sugar syrups using square formula
7.	Preparation of nomogram
8.	Effect of heat on colour pigments of fruits & vegetables
9.	Effect of heat on flavor & texture of fruits & vegetables
10.	Effect of acid & alkali on colour pigments, flavor & texture of fruits & vegetables
11.	Effect of salt in preserving different vegetables by using varying percentages of salt.
	Preparation of Different types of Pickles
12.	Lemon Hot Pickle
13.	Lemon Sweet Pickle
14.	Mango Pickle
15.	Green Chilly Pickle
16.	Mixed Vegetable Pickle in Vinegar
17.	Ginger pickle
18.	Mixed vegetable pickle in Lemon juice
19.	Brinjal Pickle
20.	Pickle from Lemon peels
21.	Chunda
22.	Onions in Vinegar
23.	Lemon sweet pickle in vinegar
	Preparation of different types of chutneys
24.	Tomato Chutney
25.	Mango Chutney
26.	Apple Chutney
27.	Amla Chutney

Practical - II Fruits Products

	Preparation of different types of jams
01.	Apple jam
02.	Pineapple jam
03.	Strawberry jam
04.	Papaya jam
05.	Mango jam
06.	Mixed fruit jam
07.	Apple-ginger jam
	Preparation of different types of Jellies & Marmalades
08.	Guava Jelly
09.	Rose Apple Jelly (Jamun)
10.	Wood apple jelly
11.	Apple-Mint Jelly
12.	Mint Jelly
13.	Orange Marmalade
14.	Lemon Marmalade
15.	Plum Marmalade
	Preparation of different types of Fruit Preserves, Candles & Cheese
16.	Guava Cheese
17.	Tuti-fruti
18.	Petha (Ashgourd Candy)
19.	Amla Preserve (Moravala)
20.	Ber Candy (Ber Khajoor)
21.	Candied Orange Peels
22.	Mango Preserve (Morabba)
23.	Pineapple preserve
24.	Ginger Candy
	Segments in Sugar Syrup
25.	Canning of Cauliflower in Urine
26.	Canning of Jam
	Vinegar Production
27.	Preparation of Synthetic Vinegar
28.	Preparation of Spiced vinegar
	Frozen Products
29.	Frozen Peas
30.	Frozen Guava Pulp
31.	Frozen Pineapple Slices
32.	Frozen Mango Pulp
	Miscellaneous Products
33.	Preparation of Raisins
34.	Preparation of dried Potato Chips
35.	Lye peeling of Orange Segments

Practical - III Fruits & Vegetables Beverages

	Preparation of different types of fruit & vegetable beverages
01.	Synthetic Syrups (Rose)
02.	Synthetic Syrups (Khus)
03.	Lemon Squash
04.	Pineapple Squash
05.	Mango Squash
06.	Orange Squash
07.	Lemon Barley Water
08.	Lemon ginger Cocktail
09.	Grape Crush
10.	Strawberry Crush
11.	Mango Nectar
12.	Papaya Nectar
13.	Lemon Cordial
14.	Raw Mango Squash (Panha)
	Preparation of Different Types of Sauces
15.	Tomato Sauce
16.	Tamarind Sauce
17.	Red Chilly Sauce
18.	Green Chilly Sauce
	Preparation of Canned & Bottled Products
19.	Bottling of Tomato Juice
20.	Bottling of Tamarind Pulp
21.	Canning of Pineapple tit-bits in sugar syrup
22.	Canning of Carrots in Brine
23.	Canning of orange segments
	Visit to a Canning and Bottling Unit
	Visit to a Jam, Jelly and beverage Manufacturing Unit
	Industrial visit very important as it is not practically possible for any Institute to show Commercial Company.

List of Tools & Equipments

Basic Processing Laboratory

Sr. No.	Name & Description of Equipment	Qty. Required (Nos.)	Remarks
1.	Hot Air Oven	1	
2.	Crown Corking Machine	1	
3.	Mixer (electronic)	1	
4.	Juicer (electronic)	1	
5.	Pulper (Small, Stainless Steel)	1	
6.	Vacuum gauge	1	
7.	Pressure Gauge	1	
8.	Hand Refractometers (Range 0 to 85 Brix)	One Set	
9.	Thermometer (Upto 250°C)	1	
10.	Physical Balance with weights	1	
11.	Chemical Balance with weights	1	
12.	Jelly bag with stand	1	
13.	Can hand seamer	1	
14.	Can Opener	1	
15.	Gas Burners	4	

16.	Gas Cylinders	4	
17.	Puree Machines (Puran Yantra) (Stainless Steel)	6	
18.	Lemon Squeezers (Stainless Steel)	6	
19.	Stainless Steel Vessels (10 Kgs capacity)	2	
20.	Stainless Steel Vessels (4 Kgs. Capacity)	6	
21.	Stainless Steel Vessels (1 Kg. Capacity)	6	
22.	Pair of tongs	6	
23.	Stainless Steel thalis	12	
24.	Cutting Boards	12	
25.	Stainless Steel Cutting knives	6	
26.	Stainless Steel peelers	6	
27.	Stainless Steel Corers	6	
28.	Spatula	6	
29.	Measuring cylinders (Plastic 1 litre cap.)	6	
30.	Wooden Shelves	2	
31.	Aluminium top tables (2' x 6')	2	
32.	Glass bottles to store spices	2 doz	
33.	Spoons (wooden)	12	
34.	Ladles	12	
35.	Kadhal (aluminium)	1	

Applied Science Laboratory

Sr. No.	Description of Tool / Equipment	Qty. Required (Nos.)	Remarks
	Large Equipment		
1.	Hot air oven	1	
2.	Incubator	1	
3.	Refrigerator – Small (100 liters)	1	
4.	Autoclave – Laboratory Model	1	
5.	Compound Microscope	5	
6.	Chemical Balance	1	

Equipment Tools :-

1. Burettes	(50 ml)	10
	(100 ml)	10
2. Conical Flasks	(250 ml)	20
	(500 ml)	5
	(1000ml)	5
3. Beakers	(250 ml)	5
4. Volumetric flasks	(100 ml)	5
	(250 ml)	5
	(500 ml)	5
	(1000 ml)	5
5. Pipettes	(10 ml)	10
	(5 ml)	10
	(2 ml)	10
	(1 ml)	10
6. Volumetric pipettes	(10 ml)	5
	(5 ml)	5
	(2 ml)	5
	(1 ml)	5

7. Test Tubes		8 doz.
8. Petri plates		4 doz.
9. Durham tubes		5 doz
10. Funnels	Small	5
	Large	2
11. Measuring Cylinder	(100 ml)	2
	(250 ml)	2
	(500 ml)	2
	(1000 ml)	2
12. Reagent Bottles	(100 ml)	5
	(250 ml)	5
	(500 ml)	5
13. Stoppard bottles for staining solutions (100 ml)		5
14. Slides		4 doz
15. Cover slip		6 boxes
16. Class rods		10
17. Spatula		6
18. Test tube stands		6
19. Test tube holders		10
20. Burette stands		10
21. Triped stands		10
22. Weight box		1
23. Bottle brushes	Small	6
	Large	6
24. Water baths		10
25. Colony counter		1

Basic Processing

1. Preservation of fruits & vegetable by Giridharialal and Siddhappa, ICMR, New Delhi.
2. A complete course in canning, book I and II by Anthony Lopez Publication of The Canning Trade, Balimore, Maryland.
3. Practical Canning by Arthur Look, Food Trade Press Ltd. London.
4. Fruit and Vegetable Preservation by Cruess
5. Technology of Food Products, SBP Consultants & Engineers, post Box No. 2131, 4/43, Roopnagar, New Delhi – 110 007.1
6. Commercial Fruits & Vegetables by S.C. Batia. Small Industry Research Institute, P.O. Box 2106, 4/43, Roopnagar, New Delhi – 110 007.
7. Food Microbiology by W.C. Frazler & D.C. Westhoff, Tata Mac-Graw Hill Publication co., New Delhi.

Applied Science

8. Fundamental Principles of Bacteriology by A.J. Salle, Tata MacCraw Hill Publication Co., New Delhi.
9. Microbiology by M.J. Pelezar, E.C.S. Chang & Noel R.King, MacGraw Hill Book Co. New York.
10. Modern Food Microbiology by J.M. Jay, d. Van Nostrand Co. New York.
11. Microbes in Naction by H. seeley & P. Van Demark, D.B. Tarapoorewala & Sons Pvt. Ltd. Bombay
12. Food Poisoning & Food Hygiene by Hobhs & Gilbert Mathew Arnold Publication, Londen.
13. Applied Food Service Sanitation – An NIFG Handbook
14. Food Chemistry by L. Meyer, A.V.I. Publication Company Connecticut
15. The Experimental study of Food by A.M. Campbell, R.M. Griswold & M.P. PENFIELD, Houghtobn Mifflin Co. Publication, Boston.
16. Principles of Sensory Evaluation of Food by M.A. America Academic Press, New York.
