

**SYLLABUS OF SEMESTER SYSTEM
FOR THE TRADE OF**

Fruits and Vegetable Processing

Under

**Craftsmen Training Scheme (CTS)
(One year/Two Semesters)**

**Redesigned in
2014**

By

**Government of India
Ministry of Labour & Employment (DGE&T)**

GENERAL INFORMATION

1. Name of the Trade: **Fruits and Vegetable Processing**
2. NCO Code No. 7414.90
3. Duration : One year (Two semester)
4. Power Norms : 5 KW
5. Space Norm: Lab Space – **96 Sq. m**
Class Room Space - **30 Sq. m**
6. Entry Qualification: Passed 10th Class Examination with Science and Mathematics
7. Unit Size(No. of students): 20
8. Instructor's/Trainer's Qualification:
 - (i) National Trade Certificate in Preservation of Fruits & Vegetables trade with three years experience in relevant field/industry.
OR
 - (ii) Diploma in Food Technology or Post Harvest Management with two years experience in relevant field/industry.
OR
 - (iii) Degree in Food Technology or Post Harvest Management with One years experience in relevant field/industry.
9. Desirable Qualification Preference will be given to craft instructor's certificate (CIC).
10. Job Profile
 - **Quality Analyst** in Fruits and vegetable processing industry.
 - **Supervisor** in Fruits and Vegetable Processing Industry.
 - **Cold Storage Supervisor** in Frozen fruits and vegetables industry.
 - **Packaging Supervisor** in Fruits and Vegetable Processing industry.
 - **Skilled worker** in Food MNC.
 - **Entrepreneur** in Fruits and vegetables processing.

Note: At least one instructor must have Degree/Diploma in particular trade

Syllabus : Fruits and Vegetable Processing**First Semester**

Week	Practical	Theory
1	Admission	
2-3	Spoilage of fruits and vegetables Industrial visit in fruits and vegetables processing industry.	Introduction - Definition and scope of preservation. History and development of food preservation industry with special reference to India. Different types of spoilages in fresh fruits and vegetables. General principles and methods of food preservation.
4-5.	Identifications of Fruits and vegetables.	Definition of Fruits and vegetables, Difference in between fruits and vegetable, Fruits and vegetables as available in different parts of the country, their preservation, season of maturity. Constituents of food, importance of fruits & Vegetables in the diet.
6-7.	Identification of spices and food additives used in fruits and vegetable processing.	Selection of raw materials including fruits and vegetables for Preparation of various products. Spices and other constituents, their properties, condiments and other additives and ingredients, and their flavouring and preservative properties.
8-9	Study of common food processing equipments such as pulper, sealers, juice extracting machines, autoclaves, corking machines etc.	Study of various equipments: usage, care/maintenance and precautions.

10-11.	Refrigeration and other methods for storing perishables.	Storage of fresh fruits and vegetable. Methods and containers used in fresh fruits and vegetable preservation
12-13	Preparation of Fruit Juice. Preservation of fruits juices with addition of preservative.	Technology of extraction of juices from different types of fruits. Definition of Preservatives-types of preservatives commonly used in food industry limits of usage of preservatives
14-15	Preparation of common fruit beverages. Determination of Acids in fruits and vegetable products	Fruit beverages: Squashes, syrups, nectars, RTS, crushes, cordial etc.
16-17	Preparation of tomato juices, puree, sauces, ketchups, soup, paste, chutney etc	Tomato products: Technology of manufacture of tomato products.
18-19	Various methods of drying: sun drying, cabinet drying and solar drying.	Sun drying & dehydration and its merits and demerits. Principles involved preservation by drying method. Treatment prior to drying. Mechanical Dehydration-Types of Dryers.
20-21	Preparation of Jam, jelly and marmalades.	Jams, Jellies and marmalades: selection, preparation, production and preservation. Difference in between jam and jelly.
22-23	Practical demonstration of sealing pouching machine. Examination of the tetra pack	Study of various types of containers like Glass, Tin-merits and demerits of each-scope for new types of containers/ packaging materials, such as plastic pouches, tetra pack, PET bottle and cartons. Understanding the label its importance, and labelling requirements
24-25	Industrial Training: Fruits and vegetables processing industry.	
26	Revision/Examination	

Syllabus : Fruits and Vegetable Processing		
Second Semester		
Week No.	Practical	Theory
1	Admission	
2-5	Preparation of wine	Fermented beverages-wines
6-7	Preparation of synthetic vinegars.	Different type of vinegar, methods of Vinegar Production.
8-10	Preparation of preserves, candies, crystallized and glazed and fruit bars.	Definition of preserves, candied fruits, glazed fruits, crystallized fruits- methods of preparation of these.
11-14	Demonstration of Canning process in fruits and vegetables canning industry. Visit to canning industry	Canning and bottling- Canning of fruits and vegetables- principles, procedure and steps involved- care in handling of common available fruits and vegetables in the region.
15-16	Identification of defective cans, Precautions while consuming the canned foods.	Scheme and layout of canning industry. Study about the various defects in canned products, lacquers.
17-18	Freezing demonstration on market sample of frozen fruits and vegetables.	Study of Frozen Fruits and Vegetables, Blanching and Freezing.
19-21	Preparations of different types of pickles from fruits and vegetables.	Pickles, chutneys and sauces, Different types of pickles, Methods of preparation curing techniques, defects and remedies.
22-23	Examination of processed products. Cleaning and maintenance of the equipments. Detection of benzoic acid, sulphur dioxide and KMS in fruits and vegetable products.	Study of Food safety Standards: HACCP, ISO 22000, GMP, and FSSAI. Importance of personal Hygiene, Cleaning & Sanitary standards in Fruits and Vegetable preservation. Good Handling Processes (GHP), Traceability

		aspects of processed product.
24-25	Industrial training in canning industry	
26	Revision/Examination	

List of Tool & Equipments		
Sr.no.	Name of the item	Qty
1	Vacuum Gauge	01 no
2	Pressure Gauge	01 no
3	Seam Checking gauge or screw gauge	01 no
4	Refractometers (Pocket) 0-32,28-62,58-920 Brix Sugar Scale	02 no
5	Brinometer (Salinometer)	02 no
6	Hydrometers of different ranges 0-30, 30-60, 60-90, Brixhydrometer	01 no
7	PH Meter (Digital)	01 no
8	Fruit Trays	6+2 no
9	Stainless steel mugs	8 no
10	Stainless steel bowls	8 no
11	Thermometer (Digital)	06 no
12	Pressure Cooker	02 no
13	Sandashi (Tongs)	01 no
14	Perforated spoons S.S.12"Length 4 " dia	06 no
15	Coring knives	06 no
16	Pitting knives	06 no
17	Cutting knives	06 no
18	Juice Extractor (Screw type) 1 HP motor	01 no
19	Lime Juice Extractor & orange juice halving & Burring	01 no
20	Crown corking machine hand operated one.	01 no
21	Pilfer proof capping machine	01 no
22	Weighing balance (digital)'	03 no
23	Stainless steel knives	6 pcs+20pcs
24	Spoons of assorted size	20pcs
25	Stainless steel degdhes	6pcs
26	Can and cork Remover	As per Requirement
27	Jell meters	6 no
28	Cabinet dryer (electrical):5 to 10 tray capacity drier,	01 no

	trays of SS/Aluminium, flat or perforated, 3/4 W, with three phase electrical connection, temp control 0 to 150 c, auto on/off.	
29	Stainless steel trays of assorted size	20 no
30	Stainless steel buckets or stainless buckets	06 no
31	Gas burner with cylinder.	06 no
32	Electric Mixer	2 no
33	Spoons, Wooden Ladle	16 no
34	Masons Jars for 1 gross bottle	01 no
35	Water Tank with tap 4'x4'x3'	01 no
36	Refrigerator double door 200 litre	01 no
37	Auto claves 20 lit cap	02 no
38	S.S.Vessels with lids 20 lit cap.	10 no
39	S.S. Vessels with lids 6 lit cap.	06 no
40	S.S.Vessels with lids 10 lit cap.	06 no
41	Hand Washing basin with tripod stands	03 no
42	Micrometer Seam Checking guage' 0.001 LC	01 no
43	Oven (drying) (0-250 C) digital Display, with auto temperature controller, suitable insulated, fans , Heating elements.	01 no
44	Pulper Electric 1/4 Tonne capacity per 8 hrs with 1 HP Motor and two S.S: Seines (1/16 mesh. 1/32 mesh)	01 no
45	Bottle Stand for 1 gross bottle	01 no
46	Distilled water Assembly/water purifier with pre filter, activates charcoal / resin unit and UV exposure units. Complete with water supply tank and piping.	01 no
47	Fruit mill (junior model, 0.5 ton/hr with 1 hp motor)	01 no
48	Stainless Steel Pricker	06 no
49	Solar dryer (cabinet type) complete with solar box. Size app 6'*3'	01 no
50	Steel scale 12" Standard steel	04 no
51	Lemon Squeezer	06 no
52	Volume Measuring Stick	04 no
53	Vacuum pan (Capacity 500 litre evaporation/Driven by motor reduction gear box/inside vessel made up of thick stainless steel plate/outer jacket is of S.S./with mail hole and sight glasses on 2 sides/Stirrer is made of Teflon blades. Fitted with an outer at the bottom and a condensate receiving vessels.	01 no
54	Deep Fridge: Temperature up to -40 C, auto temp controller	01 no
55	Mechanical peeler/ Batch type for fruit and vegetable peeling.	01 no
56	Steam jacket kettle 50 litre double jacketed with indenting lever, steam inlet and outlet with steel trolley and accessories to be fitted with boiler.	01 no

57	Baby Boiler/Diesel fuel/capacity of boiler as per capacity of steam jacket kettle.	01 no
58	Exhausting box: Straight line exhaust box has an exhaust tunnel 3048 mm long and overall length is 3962 mm. Made of strong structural iron frame.	01 no
59	Lidding machine for lidding of can/bottles	01 no
60	Sulphuring chamber 5 kg Capacity made up of wooden, place for burning sulphur and exhaust.	01 no
61	Vaccum Bottle filling machine capacity 5kg/hrs, made up of stainless steel.	01 no
62	Bottle washer: with ½ HP motor, single phase, two heads for brushes, water spray unit of 10-12 bottles.	01 no
63	Sealer for sealing of jars.	01 no
64	Shredder for slicing of fruit and vegetable capacity 5kg/hrs.	01 no
65	Sugar coating pan of stainless steel, revolving type with speed controller.	01 no
66	Improved stove made up of MS with proper safety measures , with gas cylinders	01 no
67	Pickle mixer, Rotatory type and contact part of stainless steel.	01 no
68	Heat Sealing Machine Hand/Pedal Operated	01 no
69	Stainless Steel Strainer/Sieve	06 no
70	Vernier Calliper: 15cm 0.01 mm LC	04 no
71	Desicator	03 no
72	Microscope	02 no
73	Microwave oven	01 no
74	Fermenter	02 no
75	Moisture box: Aluminium, 100gm capacity.	02 no
76	Liquid filling machine: For filling liquid in bottles, 200ml, 500ml, 1000ml. Manually operated	01 no
77	Continuous water supply	
78	Computer/laptop for Faculty with Internet Connection with, colour Printer and photo copy Scanner	01 no
79	LED multimedia Projector	01 no
80	UPS 650 VA	02 no
81	A.C for Theory room	As per requirement

CONSUMABLES TOOLS & ITEMS		
SI. No.	Name of the item/tools	Qty
1	Beaker 50, 100, 250 ml, 500 ml	12 no
2	Conical flask 50, 100, 250 ml, 500 ml	12 no
3	Measuring cylinder 100ml, 250ml, 200 ml, 500ml,	12 no
4	Measuring flask of assorted sizes	12 no
5	Burette of assorted sizes with Burette stands	12 no
6	Pipettes of assorted sizes	12 no
7	Thermometer (10°C to 110°C) Digital	20Pcs
8	Rubber Gloves	12 pair for each trainee
9	Aprons	01 for each trainee
10	Jelly Filter bags	04Pcs
11	Glass Funnels of assorted sizes	12 no
12	Funnels 500ml. & 100ml. separating	12 no
13	Test Tube With Test tube stand	25 no
14	Glass rod	10 no
15	Gas lighter	06 no
16	Ph meter Rod	02 no
17	Petri dish with cover	20 no
18	Glass slides	20pcs
19	Refilling of gas cylinder for lab	As per required
20	Air tight glass container of different size	As per required

CONSUMABLES ITEMS & CHEMICALS		
SI. No.	Name of the item	Qty.
1	Photo Copy Paper A4	As per Required
2	Scale	As per Required
3	Correcting Fluid pen	As per Required
4	Dusting Cloth	As per Required
5	Pen	As per Required
6	Temporary marker	As per Required
7	Stapler (Small & Big)	As per Required
8	Puncher	As per Required
9	Fevi stick	As per Required
10	Stapler Pin	As per Required
11	Ruled Register	As per Required
12	File Folder	As per Required
13	Vim Liquid	As per Required

14	Dettol Hand wash	As per Required
15	Scotch Bright	As per Required
16	Colin	As per Required
17	Aluminium Foils	As per Required
18	Duster	As per Required
19	Juna	As per Required
20	Seasonal Fruits and Vegetables	As per Required
21	Salt	As per Required
22	Sugar	As per Required
23	red chilly	As per Required
24	black pepper	As per Required
25	Dalchini	As per Required
26	large elaychi	As per Required
27	Jeera	As per Required
28	Saunf	As per Required
29	Laung	As per Required
30	Vinegar	As per Required
31	Butter	As per Required
32	Hing	As per Required
33	Methi	As per Required
34	mustard oil	As per Required
35	Glucose	As per Required
36	food grade color	As per Required
37	food grade flavour	As per Required
38	Sodium Benzoate	As per Required
39	Potassium met bisulphide	As per Required
40	citric acid	As per Required
41	Glacial Acetic acid	As per Required
42	Other Chemicals/Raw material Require for Practical's	As per Required
43	Tissue paper roll	As per Required

FURNITURE		
SI. No.	Class Room	Qty. for 20 trainees
1	Instructor Chair & Table with Glass	01 no
2	Magnetic White Board	01 no
3	Display Board	01 no
4	Table for computer/printer/scanner with chair	01 Set
5	Dual Desk	08 no
SI. No.	Workshop/Lab	Qty. for 20 trainees
1	Working table with 6-3x21/2 Aluminium tops	05 no

2	Stools	20 no
3	Laboratory Table with rack (8'*2'-6"-6") and sinks	04 no
4	Racks for keeping books (glass panel)etc	01 sets
5	Trainee Locker with space for 20	01 no
6	Storage Rack for Chemicals	01 no
7	Cup Board (large)	04 no
8	First Aid Box	01 no
9	Fire Extinguisher	As per required
10	Goodrej Almirha	02 no
11	Wooden Show Case For keeping & Display sample	02 no
12	White Board	01 no

- Raw material, Testing chemicals and consumables are not included in the list.