



GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP
DIRECTORATE GENERAL OF TRAINING

COMPETENCY BASED CURRICULUM

FRUITS AND VEGETABLES PROCESSING

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4



SECTOR – FOOD INDUSTRY



Directorate General of Training

FRUITS AND VEGETABLES PROCESSING

(Non-Engineering Trade)

(Revised in 2019)

Version: 1.2

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL - 4

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

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1. COURSE INFORMATION

During the one-year duration of 'Fruits and Vegetables Processing' trade; a candidate is trained on Professional Skill, Professional Knowledge and Employability Skill related to the job role. In addition to this, a candidate is entrusted to undertake project work, extracurricular activities and on-the-job training to build up confidence. The broad components covered under Professional Skill subject are as below:

The trainee learns to identify the spoilage in fruits and vegetables and state the reason for the spoilage; prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions; identify and select fresh fruits and vegetables with the help of checklist; prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity and TSS content. The learner practices on identification of spices and food additives by visual inspection; learns to prepare and package fruit beverages such as Squashes, RTS, Nectar, Cordial, Crush and Syrup by using appropriate machines such as pulper, juice extractor, autoclave, and corking machine with safety precautions, determine the acidity and TSS content; prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine with safety precautions, determine acidity and TSS content; prepare, dry and storage fruits and vegetables with appropriate methods such as drying, cabinet drying and solar drying with safety precautions and determine the moisture etc.

The trainee is trained to prepare, preserve and store jam, jelly and marmalades by using appropriate machines such as pulper, autoclave & sealer with safety precautions, determine acidity and TSS content, pectin test; examine the tetra pack w.r.to the materials of construction & dimension and its type; explain and understand the process of wine preparation and canning process of fruits and vegetables and identify defects by physical observation & its causes in canned foods and explain food safety standards. The trainee develops the skill of preparing synthetic vinegar by using appropriate tools and checks the quality .He/she is able to explain other methods of vinegar production and its types; prepare preserve (murabba), candy, crystallized and fruit bar by using appropriate machines/Tools such as solar drier, cabinet drier, weighing balance and refractometer with safety precautions and determine the TSS contents; also prepare fruits/ vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content; check physical quality parameters in frozen market samples of frozen fruits and vegetables.

2. TRAINING SYSTEM

2.1 GENERAL

The Directorate General of Training (DGT) under Ministry of Skill Development & Entrepreneurship offers a range of vocational training courses catering to the need of different sectors of economy/ Labour market. The vocational training programmes are delivered under the aegis of Directorate General of Training (DGT). Craftsman Training Scheme (CTS) with variants and Apprenticeship Training Scheme (ATS) are two pioneer schemes of DGT for strengthening vocational training.

Fruits and Vegetables Processing trade under CTS is one of the popular courses delivered nationwide through a network of ITIs. The course is of one-year duration. It mainly consists of Domain area and Core area. In the Domain area (Trade Theory & Practical) imparts professional skills and knowledge, while the core area (Employability Skill) imparts requisite core skills, knowledge and life skills. After passing out the training program, the trainee is awarded National Trade Certificate (NTC) by DGT which is recognized worldwide.

Candidates broadly need to demonstrate that they are able to:

- Read and interpret parameters/ documents, plan and organize work processes, identify necessary materials and tools;
- Perform tasks with due consideration to safety rules, accident prevention regulations and environmental protection stipulations;
- Apply professional skill, knowledge & employability skills while performing jobs.
- Document the parameters related to the task undertaken.

2.2 PROGRESSION PATHWAYS

- Can join industry as Craftsman and will progress further as Senior Craftsman, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programs in different types of industries leading to a National Apprenticeship certificate (NAC).
- Can join Crafts Instructor Training Scheme (CITS) in the trade for becoming instructor in ITIs.
- Can join Advanced Diploma (Vocational) courses under DGT as applicable.

2.3 COURSE STRUCTURE

Table below depicts the distribution of training hours across various course elements during a period of one year: -

S No.	Course Element	Notional Training Hours
1	Professional Skill (Trade Practical)	1200
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	160
	Total	1600

2.4 ASSESSMENT & CERTIFICATION

The trainee will be tested for his skill, knowledge and attitude during the period of course through formative assessment and at the end of the training programme through summative assessment as notified by the DGT from time to time.

a) The **Continuous Assessment** (Internal) during the period of training will be done by **Formative Assessment Method** by testing for assessment criteria listed against learning outcomes. The training institute has to maintain an individual trainee portfolio as detailed in assessment guideline. The marks of internal assessment will be as per the formative assessment template provided on www.bharatskills.gov.in.

b) The final assessment will be in the form of summative assessment. The All India Trade Test for awarding NTC will be conducted by **Controller of examinations, DGT** as per the guidelines. The pattern and marking structure are being notified DGT from time to time. **The learning outcome and assessment criteria will be the basis for setting question papers for final assessment. The examiner during final examination will also check** the individual trainee's profile as detailed in assessment guideline before giving marks for practical examination.

2.4.1 PASS REGULATION

For the purposes of determining the overall result, weightage of 100% is applied for six months and one-year duration courses and 50% weightage is applied to each examination for two years courses. The minimum pass percent for Trade Practical and Formative assessment is 60% & for all other subjects is 33%. There will be no Grace marks.

2.4.2 ASSESSMENT GUIDELINE

Appropriate arrangements should be made to ensure that there will be no artificial barriers to assessment. The nature of special needs should be taken into account while undertaking the assessment. Due consideration should be given while assessing for teamwork, avoidance/reduction of scrap/wastage and disposal of scrap/waste as per procedure, behavioral attitude, sensitivity to the environment and regularity in training. The sensitivity towards OSHE and self-learning attitude are to be considered while assessing competency.

Assessment will be evidence based comprising the following:

- Job carried out in labs/workshop
- Record book/ daily diary
- Answer sheet of assessment
- Viva-voce
- Progress chart
- Attendance and punctuality
- Assignment
- Project work

Evidences and records of internal (Formative) assessments are to be preserved until forthcoming examination for audit and verification by examining body. The following marking pattern to be adopted while assessing:

Performance Level	Evidence
(a) Weightage in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	<ul style="list-style-type: none"> • Demonstration of good skills and accuracy in the field of work/ assignments. • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b) Weightage in the range of 75%-90% to be allotted during assessment	
For this grade, a candidate should produce work which demonstrates attainment of a reasonable standard of craftsmanship, with little guidance, and regard for safety procedures and practices	<ul style="list-style-type: none"> • Good skill levels and accuracy in the field of work/ assignments. • A good level of neatness and consistency to accomplish job activities. • Little support in completing the task/job.

(c) Weightage in the range of more than 90% to be allotted during assessment	
For performance in this grade, the candidate, with minimal or no support in organization and execution and with due regard for safety procedures and practices, has produced work which demonstrates attainment of a high standard of craftsmanship.	<ul style="list-style-type: none"> • High skill levels and accuracy in the field of work/ assignments. • A high level of neatness and consistency to accomplish job activities. • Minimal or no support in completing the task/ job.

Fruit and Vegetable Preservers, other; perform variety of routine tasks in canning and preserving food, fruits and vegetables not elsewhere classified, and may be designated according to nature of work performed such as: Peeler Hand peels skin of fruits and vegetables using hand knife. Grader examines, classifies and separates fruits, vegetables and fish according to size, quality, colour, condition or species. Washer tends machine that washes raw fruits or vegetables preparatory to canning, freezing or packing. Feeder Charger feeds machine with fruits or vegetables by hand for washing, shelling, shredding, cooking and pulping.

Reference NCO-2015:

- a) 7514.9900 – Fruits, Vegetables and Related Preservers, Others.

4. GENERAL INFORMATION

Name of the Trade	FRUITS AND VEGETABLES PROCESSING
Trade Code	DGT/1041
NCO - 2015	7514.9900
NSQF Level	Level-4
Duration of Craftsmen Training	One Year (1600 Hours)
Entry Qualification	Passed 10 th Class examination with Science and Mathematics or its equivalent
Eligibility for PwD	LD, CP, LC, DW, AA, LV, HH, DEAF, AUTISM, SLD, ID
Minimum Age	14 years as on first day of academic session.
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	96 Sq. m
Power Norms	5 KW
Instructors Qualification for:	
(i) Fruits and Vegetables Processing Trade	<p>B.Voc/Degree in Food Technology or Post Harvest Management from UGC recognized university/college with One-year experience in relevant field/industry.</p> <p style="text-align: center;">OR</p> <p>Diploma (Minimum 2 years) in Food Technology or Post Harvest Management from recognized board or relevant Advanced Diploma (Vocational) from DGT with two years' experience in relevant field/industry.</p> <p style="text-align: center;">OR</p> <p>NTC/NAC passed in "Fruits and Vegetables Processing" trade with three years experience in relevant field.</p> <p>Essential Qualification: Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT.</p> <p>Note:- <i>Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC qualifications. However both of them must possess NCIC in any of its variants.</i></p>

(ii) Employability Skill	MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills from DGT institutes. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above) <p style="text-align: center;">OR</p> Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills from DGT institutes.		
(iii) Minimum Age for Instructor	21 Years		
List of Tools and Equipment	As per Annexure – I		
Distribution of training on hourly basis: (Indicative only)			
Total Hrs /week	Trade Practical	Trade Theory	Employability Skills
40 Hours	30 Hours	6 Hours	4 Hours

Learning outcomes are a reflection of total competencies of a trainee and assessment will be carried out as per the assessment criteria.

5.1 LEARNING OUTCOMES (TRADE SPECIFIC)

1. Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions.
2. Identify and select fresh fruits and vegetables with the help of checklist.
3. Identify spices and food additives by visual inspection.
4. Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions.
5. Prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity and TSS content.
6. Prepare and package fruit beverages such as Squashes, RTS, Nectar, Cordial, Crush and Syrup by using appropriate machines such as pulper, juice extractor, autoclave, and corking machine with safety precautions, determine the acidity and TSS content.
7. Prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine with safety precautions, determine acidity and TSS content.
8. Prepare, dry and storage fruits and vegetables with appropriate methods such as drying, cabinet drying and solar drying with safety precautions and determine the moisture.
9. Prepare, preserve and store jam, jelly and marmalades by using appropriate machines such as pulper, autoclave & sealer with safety precautions, determine acidity and TSS content, pectin test.
10. Examine the tetra pack w.r.t to the materials of construction & dimension and its type.

11. Prepare preserve (murabba), candy, crystallized and fruit bar by using appropriate machines/Tools such as solar drier, cabinet drier, weighing balance and refractometer with safety precautions and determine the TSS contents.
12. Prepare synthetic vinegar by using appropriate tools and check the quality and explain other methods of vinegar production and its types.
13. Explain and understand the process of wine preparation and canning process of fruits and vegetables and Identify defects by physical observation & its causes in canned foods and explain food safety standards.
14. Prepare fruits/ vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content.
15. Check physical quality parameters in frozen market samples of frozen fruits and vegetables.

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions.	Observe the spoiled fruits and vegetables and its products.
	Identify and record the cause of spoilage.
	State general principle and methods of food preservations.
2. Identify and select fresh fruits and vegetables with the help of checklist.	Identify fruits and vegetables.
	Prepare selection criteria check list for fruits and vegetables.
	Select fresh fruits and vegetables
3. Identify spices and food additives by visual inspection.	Identify spices.
	Identify food additives.
4. Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions.	Prepare fruits/vegetables for Refrigeration
	Fill and seal the fruits/vegetables into packaging material.
	Store under refrigerated condition.
5. Prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity and TSS content.	Maintain the perfect hygiene standard.
	Select perfect fruits.
	Prepare fruits for juice.
	Wash fruits.
	Prepare fruits juice.
	Measure juice.
	Determine TSS content.
	Determine acidity.
	Perform calculation.
	Fill the preserved fruit juices in sterilized bottles.
	Cork and crown the bottles.
Sterilize the bottles.	
Label the bottles.	

	Maintain safety.
6. Prepare and package fruit beverages such as Squashes, RTS, Nectar, Cordial, Crush and Syrup by using appropriate machines such as pulper, juice extractor, autoclave, and corking machine with safety precautions, determine the acidity and TSS content.	Maintain perfect hygiene standard. Select perfect fruits. Prepare fruits for juice extraction. Prepare fruit juice. Measure fresh fruit juice. Determine TSS content. Determine Acidity. Perform calculations for Squashes, RTS, Nectar, Cordial, Crush and Syrup preparation and mixing of ingredients. Fill beverage into sterilized bottles. Cork and crown the bottles. Label the bottle. Maintain safety.
7. Prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine with safety precautions, determine acidity and TSS content.	Maintain perfect hygiene standard. Prepare tomatoes. Prepare tomato juice/ tomato puree/tomato paste/ tomato sauce/tomato ketchup/tomato chutney/tomato soup. Preserve and store tomato juice/ tomato puree/ tomato paste / tomato sauce / tomato ketchup / tomato chutney/ tomato soup. Determine TSS. Determine acidity. Maintain safety
8. Prepare, dry and storage fruits and vegetables with appropriate methods such as drying, cabinet drying and solar drying with safety precautions and determine the moisture.	Maintain perfect hygiene standard. Select fruits/vegetables for drying. Prepare fruits/vegetables for drying. Dry the fruits/vegetables by sun drying/ cabinet drying /solar drying. Determine the moisture content. Pack and store. Maintain safety.
9. Prepare, preserve and store jam, jelly and marmalades by using	Maintain perfect hygiene standard. Select fruits. Prepare fruit.

appropriate machines such as pulper, autoclave & sealer with safety precautions, determine acidity and TSS content, pectin test.	Prepare fruit juice for fruit jelly.
	Pectin test of fruit juice.
	Prepare jam/jelly/marmalades.
	Determine the end point for jam/jelly/marmalades.
10. Examine the tetra pack w.r.t to the materials of construction & dimension and its type.	Identify the material used in tetra pack layers.
	Check the weight of various types of tetra pack.
	Measure the thickness of tetra pack.
	Check the dimension of tetra pack.
	Identify the types of tetra pack.
11. Explain and understand the process of wine preparation and canning process of fruits and vegetables and Identify defects by physical observation & its causes in canned foods and explain food safety standards.	Maintain safety.
	Express the understanding of the defects such as pin holes, color defects, swell defects, coating defect, can-end-defect, handling defects and seam defects in cans.
	Explain process of canning, wine preparation, causes of defects in canned foods.
12. Prepare synthetic vinegar by using appropriate tools and check the quality and explain other methods of vinegar production and its types.	State the food safety standards.
	Maintain perfect hygiene standard.
	Prepare synthetic vinegar.
	Test and adjust pH and titrable Acidity of vinegar.
13. Prepare preserve (murabba), candy, crystallized and fruit bar by using appropriate	Bottle the synthetic vinegar.
	Maintain safety.
	Maintain perfect hygiene standard.
	Select fruits/vegetables.
	Prepare fruit/vegetables.
	Prepare syrup.
	Test and adjust TSS content of syrup.



machines/Tools such as solar drier, cabinet drier, weighing balance and refractometer with safety precautions and determine the TSS contents.	Dry fruits/vegetables for candy.
	Crystallized.
	Pack and store.
	Maintain safety.
14. Prepare fruits/vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content.	Maintain perfect hygiene standard.
	Select fruits/vegetables.
	Wash fruits/vegetables.
	Prepare fruit/vegetables.
	Prepare spices for pickle.
	Prepare pickles with oil/salt/vinegar.
	Test titrable Acidity in pickle.
	Pack and store.
Maintain safety.	
15. Check physical quality parameters in frozen market samples of frozen fruits and vegetables.	State blanching and freezing of fruits/ vegetables.
	Check the physical parameter of market sample of frozen fruits/vegetables and enter data in record sheet.
	Prepare solution for blanching test.
	Check per oxidase activity in frozen vegetable market sample.

7. TRADE SYLLABUS

SYLLABUS FOR FRUITS AND VEGETABLES PROCESSING TRADE			
DURATION: ONE YEAR			
Duration	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions.	1. Spoilage of fruits and vegetables. (30 hrs.) 2. Industrial visit in fruits and vegetables processing industry. (30hrs.)	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. (12 hrs.)
Professional Skill 30 Hrs; Professional Knowledge 06 Hrs	Identify and select fresh fruits and vegetables with the help of checklist.	3. Identifications of Fruits and vegetables. (30 hrs.)	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. (06 hrs.)
Professional Skill 60Hrs; Professional Knowledge 12Hrs	Identify spices and food additives by visual inspection.	4. Identification of spices and food additives used in fruits and vegetable processing. (60 hrs.)	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. (12 hrs.)
Professional	Prepare and pack	5. Study of common food	Study of various equipment:



Skill 60 Hrs; Professional Knowledge 12 Hrs	perishables for storage and then store under refrigerated conditions with safety precautions.	processing equipment such as pulper, sealers, juice extracting machines, autoclaves, corking machines etc. (30 hrs.)	usage, care/maintenance and precautions. (06 hrs.)
		6. Refrigeration and other methods for storing perishables. (30 hrs.)	Storage of fresh fruits and vegetable. Methods and containers used in fresh fruits and vegetable preservation. (06 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare fruit juices with juice extracting machines with safety precautions and preserve fruit juices with addition of preservatives and determine the acidity and TSS content.	7. Preparation of Fruit Juice. (30 hrs.) 8. Preservation of fruits juices with addition of preservative. (30 hrs.)	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. (12 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare and package fruit beverages such as Squashes, RTS, Nectar, Cordial, Crush and Syrup by using appropriate machines such as pulper, juice extractor, autoclave, and corking machine with safety precautions, determine the acidity and TSS content.	9. Preparation of common fruit beverages. (30 hrs.) 10. Determination of Acids in fruits and vegetable products. (30 hrs.)	Fruit beverages: Squashes, syrups, nectars, RTS, crushes, cordial etc. (12 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine	11. Preparation of tomato juices, puree, sauces, ketchups, soup, paste, chutney etc. (60 hrs.)	Tomato products: Technology of manufacture of tomato products. (12 hrs.)



	with safety precautions, determine acidity and TSS content.		
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare, dry and storage fruits and vegetables with appropriate methods such as drying, cabinet drying and solar drying with safety precautions and determine the moisture.	12. Various methods of drying: sun drying, cabinet drying and solar drying. (60 hrs.)	Sun drying & dehydration and its merits and demerits. Principals involved preservation by drying method. Treatment prior to drying. (12 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare, preserve and store jam, jelly and marmalades by using appropriate machines such as pulper, autoclave & sealer with safety precautions, determine acidity and TSS content, pectin test.	13. Preparation of Jam, jelly and marmalades. (60 hrs.)	Jams, nellies and marmalades: selection, preparation, production and preservation. Difference in between jam and jelly. (12 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Examine the tetra pack w.r.t to the materials of construction & dimension and its type.	14. Practical demonstration of sealing pouching machine. (30 hrs.) 15. Examination of the tetra pack. (30 hrs.)	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 labeling requirements. (12 hrs.)
Professional Skill 150 Hrs; Professional	Explain and understand the process of wine preparation and	16. Preparation of wine. (150 hrs.)	Fermented beverages-wines. (30 hrs.)



Knowledge 30 Hrs	canning process of fruits and vegetables and Identify defects by physical observation & its causes in canned foods and explain food safety standards.		
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare synthetic vinegar by using appropriate tools and check the quality and explain other methods of vinegar production and its types.	17. Preparation of synthetic vinegars. (60 hrs.)	Different type of vinegar, methods of Vinegar Production. (12 hrs.)
Professional Skill 300 Hrs; Professional Knowledge 60 Hrs	Prepare preserve (murabba), candy, crystallized and fruit bar by using appropriate machines/Tools such as solar drier, cabinet drier, weighing balance and refractometer with safety precautions and determine the TSS contents.	18. Preparation of preserves, candies, crystallized and glazed and fruit bars. (60 hrs.) 19. Demonstration of Canning process in fruits and vegetables canning industry. Visit to canning industry. (90 hrs.)	Definition of preserves, candied fruits, glazed fruits, crystallized fruits- methods of preparation of these. (12 hrs.) 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. (24 hrs.)
		20. Identification of defective cans, Precautions while consuming the canned foods. (60 hrs.)	Scheme and layout of canning industry. Study about the various defects in canned products, lacquers. (12 hrs.)
		21. Freezing demonstration on market sample of frozen fruits and vegetables. (60 hrs.)	Study of Frozen Fruits and Vegetables, Blanching and Freezing. (12 hrs.)
Professional Skill 60 Hrs;	Prepare fruits/vegetables pickles with oil/ salt/	22. Preparations of different types of pickles from fruits and vegetables. (60 hrs.)	Pickles, chutneys and sauces, Different types of pickles. Methods of preparation curing

Professional Knowledge 12 Hrs	vinegar/ spices, determine acidity content.		techniques, defects and remedies. (12 hrs.)
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Check physical quality parameters in frozen market samples of frozen fruits and vegetables.	23. Examination of processed products. (20 hrs.) 24. Cleaning and maintenance of the equipments. (25 hrs.) 25. Detection of benzoic acid, Sulphur dioxide and KMS in fruits and vegetable products. (15 hrs.)	Study of Food safety Standards: HACCP, ISO22000, GMP, and FSSAI. Importance of personal Hygiene, Cleaning & Sanitary standards in Fruits and Vegetable preservation. Good Handling Processes (GHP), Traceability aspects of processed product. (12 hrs.)
Industrial training in canning industry			

SYLLABUS FOR CORE SKILLS

1. Employability Skills (Common for all CTS trades) (160Hrs)

Learning outcomes, assessment criteria, syllabus and Tool List of Core Skills subjects which is common for a group of trades, provided separately in www.bharatskills.gov.in

LIST OF TOOLS & EQUIPMENT			
FRUITS AND VEGETABLES PROCESSING			
(For the batch of 24 candidates)			
S No.	Name of the Tools and Equipment	Specification	Quantity
A. Equipment, Machine & Tools			
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 nos.
5.	Brinometer (Salinometer)		02 nos.
6.	Hydrometers of different ranges	0-30, 30-60, 60-90, Brix-hydrometer	01 no.
7.	PH Meter (Digital)		01 no.
8.	Fruit Trays		08 nos.
9.	Stainless steel mugs		08 nos.
10.	Stainless steel bowls		08 nos.
11.	Thermometer (Digital)		06 nos.
12.	Pressure Cooker		02 nos.
13.	Sandashi (Tongs)		06 nos.
14.	Perforated spoons S.S.12"Length 4 " dia		06 nos.
15.	Coring knives		06 nos.
16.	Pitting knives		06 nos.
17.	Cutting knives		06 nos.
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 nos.
23.	Stainless steel knives		16 pcs.
24.	Spoons of assorted size		16 pcs.
25.	Stainless steel degches		6 pcs.

26.	Can and cork Remover		As per Requirement
27.	Jell meters		6 nos.
28.	Cabinet dryer (electrical)		01 no.
29.	Stainless steel trays of assorted size		16 nos.
30.	Stainless steel buckets or stainless buckets		06 nos.
31.	Gas burner with cylinder.		06 nos.
32.	Electric Mixer		2 nos.
33.	Spoons, Wooden Ladle		16 nos.
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 nos.
38.	S.S. Vessels with lids 20 lit cap.		10 nos.
39.	S.S. Vessels with lids 6 lit cap.		06 nos.
40.	S.S. Vessels with lids 10 lit cap.		06 nos.
41.	Hand Washing basin with tripod stands		03 nos.
42.	Micrometer Seam Checking gauge' 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 prefilter, 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 nos.
49.	Solar dryer (cabinet type) complete with solar box. Size app 6'*3'		01 no.

50.	Steel scale 12" Standard steel		04 nos.
51.	Lemon Squeezer		06 nos.
52.	Volume Measuring Stick		04 nos.
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 SS/ 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.	As required
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.	Vacuum Bottle filling machine capacity 5kg/hrs, made up of stainless steel.		01 no.
62.	Bottle washer	With V2 HP motor, single	01 no.

		phase, two heads for brushes, water spray unit of 10-12 bottles.	
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 nos.
70.	Vernier Calliper	15cm 0.01 mm LC	04 nos.
71.	Desiccator		03 nos.
72.	Microscope		02 nos.
73.	Microwave oven		01 no.
74.	Fermenter		02 nos.
75.	Moisture box	Aluminium, 100gm capacity.	02 nos.
76.	Liquid filling machine	For filling liquid in bottles, 200ml, 500ml, 1000ml. Manually operated	01 no.
77.	Continuous water supply		As required
78.	Computer/Laptop for Faculty with Internet Connection with, colour Printer and photo copy Scanner	CPU: 32/64 Bit i3/i5/i7 or latest processor, Speed: 3 GHz or Higher. RAM:-4 GB DDR-III or Higher, Wi-Fi Enabled. Network Card: Integrated Gigabit Ethernet, with USB Mouse, USB Keyboard and Monitor (Min. 17 Inch. Licensed Operating System and Antivirus compatible with trade related software.	01 no.
79.	LED multimedia Projector		01 no.

80.	UPS		As required
81.	A.C for Theory room		As required
B. CONSUMABLES TOOLS & ITEMS			
82.	Beaker	50, 100, 250 ml, 500 ml	12 nos.
83.	Conical flask	50, 100, 250 ml, 500 ml	12 nos.
84.	Measuring cylinder	100ml, 250ml, 200 ml, 500ml,	12 nos.
85.	Measuring flask of assorted sizes		12 nos.
86.	Burrete of assorted sizes with Burrete stands		12 nos.
87.	Pipettes of assorted sizes		12 nos.
88.	Thermometer Digital	10°C to 110°C	16 Pcs
89.	Rubber Gloves		12 pair for each trainee
90.	Aprons		01 for each trainee
91.	Jelly Filter bags		04 Pcs
92.	Glass Funnels of assorted sizes		12 nos.
93.	Funnels 500m1. & 100m1. separating		12 nos.
94.	Test Tube With Test tube stand		25 nos.
95.	Glass rod		10 nos.
96.	Gas lighter		06 nos.
97.	Ph meter Rod		02 nos.
98.	Petri dish with cover		16 nos.
99.	Glass slides		16 pcs.
100.	Refilling of gas cylinder for lab		As required
101.	Air tight glass container of different size		As required
C. CONSUMABLES ITEMS & CHEMICALS			
102.	Photo Copy Paper A4		As required
103.	Scale		As required
104.	Correcting Fluid pen		As required
105.	Dusting Cloth		As required
106.	Pen		As required
107.	Temporary marker		As required
108.	Stapler (Small & Big)		As required
109.	Puncher		As required
110.	Fevi stick		As required
111.	Stapler Pin		As required

112.	Ruled Register		As required
113.	File Folder		As required
114.	Vim Liquid		As required
115.	Dettol Hand wash		As required
116.	Scotch Bright		As required
117.	Colin		As required
118.	Aluminum Foils		As required
119.	Duster		As required
120.	Juna		As required
121.	Seasonal Fruits and Vegetables		As required
122.	Salt		As required
123.	Sugar		As required
124.	red chilly		As required
125.	black pepper		As required
126.	Dalchini		As required
127.	large elaychi		As required
128.	Jeera		As required
129.	Saunf		As required
130.	Laung		As required
131.	Vinegar		As required
132.	Butter		As required
133.	Hing		As required
134.	Methi		As required
135.	mustard oil		As required
136.	Glucose		As required
137.	food grade color		As required
138.	food grade flavour		As required
139.	Sodium Benzoate		As required
140.	Potassium met bisulphide		As required
141.	citric acid		As required
142.	Glacial Acetic acid		As required
143.	Other Chemicals/Raw material Require for Practical's		As required
144.	Tissue paper roll		As required
D: Furniture			
Class Room			
145.	Instructor Chair & Table with Glass		01 no.

146.	Magnetic White Board		01 no.
147.	Display Board		01 no.
148.	Table for computer/printer/scanner with chair		01 Set
149.	Dual Desk		12 nos.
Workshop / Lab			
150.	Working table with 6-3x21/2 Aluminum tops		05 no
151.	Stools		24 no
152.	Laboratory Table with rack and sinks	8'*2'-6"-6"	04 no
153.	Racks for keeping books (glass panel)etc.		01 sets
154.	Trainee Locker with space for 20		01 no
155.	Storage Rack for Chemicals		01 no
156.	Cup Board (large)		04 no
157.	First Aid Box		01 no
158.	Fire Extinguisher		As per required
159.	Godrej Almirah		02 no
160.	Wooden Show Case For keeping & Display sample		02 no
161.	White Board		01 no

Note:

1. Internet facility is desired to be provided in the class room.

The DGT sincerely acknowledges contributions of the Industries, State Directorates, Trade Experts, Domain Experts, trainers of ITIs, NSTIs, faculties from universities and all others who contributed in revising the curriculum.

Special acknowledgement is extended by DGT to the following expert members who had contributed immensely in this curriculum.

List of Expert contributed/ participated for finalizing the course curriculum of Fruits and Vegetables Processing trade			
S No.	Name & Designation Sh/Mr/Ms	Organization	Remarks
Members of Sector Mentor council			
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2.	Dr S.L Shrivastava, Professor	Indian Institute of Technology, Kharagpur	Member
3.	Dr. Vikas Nanda, Associate Professor	Food Engineering and Tech. Dept, S.L.I.E.T, Longowal, Punjab	Member
4.	Dr Ashok Kumar, Professor	Department of Process and Food Engineering, Punjab Agriculture University, Ludhiana, Punjab	Member
5.	Dr. D.S. Sogi, Professor	Department of Food Science and Technology, Guru Nanak Dev University, Amritsar, Punjab	Member
6.	Dr. Neeraj Kumar, Assistant Professor	National institute of food technology Entrepreneurship & Management, Kundli, Sonipat, Haryana	Member
7.	Rakesh Kumar, Principal	Govt. I.T.I, Hajipur, Bihar	Member
8.	M.A. Tejani	Gits Foods Products Pvt.Ltd, Pune	Member
9.	Er Parduman singh, Principal	Govt. I.T.I, Nabha, Punjab	Member
10.	Dr P.S Negi, Scientist	Central Food Technological, Research Institute, Mysore	Member

11.	Rizwana Ansari, T.O.	Govt. I.T.I, Chindwara, Madhya Pradesh	Member
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Mentor			
16.	J.P Meena, Director	DGET HQ, New Delhi.	Mentor
Members of Core Group			
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18.	G.Mohan, ADT	NIMI, Chennai.	Member
19.	Raminder Kumar, V.I.	R.V.T.I, Panipat	Team Leader
20.	Sriya Suman Patro, Lecturer	Government Polytechnic, Behrampur, Ganjam, Odisha	Member
Industry Member			
21.	Gagandeep Gupta, Quality Assurance Manager	International Fresh Farm Product India, Ltd, Channo, Sangrur, Punjab	Member
22.	Paramdeep Singh Ghuman	Moonak Distiller and Bottler pvt Ltd, Moonak, Sangrur, Punjab	Member
23.	Vijay Singh, G.M.	International Mega Food Park, Fazilka, Punjab	Member
24.	Ranveer Singh, Sr. Manufacturer Executive	I.T.C, Greater Noida, U.P.	Member
25.	Rohit Verma, G.M.	Jupiter multi-fruit processor Plot no 1, phase III, Industrial area Talliwal, District Una, H.P.	Member

ABBREVIATIONS

CTS	Craftsmen Training Scheme
ATS	Apprenticeship Training Scheme
CITS	Craft Instructor Training Scheme
DGT	Directorate General of Training
MSDE	Ministry of Skill Development and Entrepreneurship
NTC	National Trade Certificate
NAC	National Apprenticeship Certificate
NCIC	National Craft Instructor Certificate
LD	Locomotor Disability
CP	Cerebral Palsy
MD	Multiple Disabilities
LV	Low Vision
HH	Hard of Hearing
ID	Intellectual Disabilities
LC	Leprosy Cured
SLD	Specific Learning Disabilities
DW	Dwarfism
MI	Mental Illness
AA	Acid Attack
PwD	Person with disabilities

