



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- 3.5



SECTOR –FOOD INDUSTRY



Directorate General of Training

FRUITS AND VEGETABLES PROCESSING

(Non-Engineering Trade)

(Revised in March 2023)

Version: 2.0

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL – 3.5

Developed By

Ministry of Skill Development and Entrepreneurship

Directorate General of Training

CENTRAL STAFF TRAINING AND RESEARCH INSTITUTE

EN-81, Sector-V, Salt Lake City,
Kolkata – 700 091

www.cstaricalcutta.gov.in

CONTENTS

S No.	Topics	Page No.
1.	Course Information	1
2.	Training System	2
3.	Job Role	6
4.	General Information	7
5.	Learning Outcome	9
6.	Assessment Criteria	11
7.	Trade Syllabus	15
8.	Annexure I (List of Trade Tools & Equipment)	21
9.	Annexure II (List of Trade experts)	28

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)	840
2	Professional Knowledge (Trade Theory)	240
3	Employability Skills	120
	Total	1200

Every year 150 hours of mandatory OJT (On the Job Training) at nearby industry, wherever not available then group project is mandatory.

On the Job Training (OJT) / Group Project	150
Optional Courses (10th/ 12th class certificate along with ITI certification or add on short term courses)	240

Trainees of one-year or two-year trade can also opt for optional courses of up to 240 hours in each year for 10th/ 12th class certificate along with ITI certification, or, add on short term courses.

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%.

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 some of 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
- Computer based multiple choice question examination
- Practical Examination

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 for formative assessment:

Performance Level	Evidence
(a) Marks in the range of 60%-75% to be allotted during assessment	
For performance in this grade, the candidate	<ul style="list-style-type: none"> • Demonstration of good skills and accuracy

should produce work which demonstrates attainment of an acceptable standard of craftsmanship with occasional guidance, and due regard for safety procedures and practices	<p>in the field of work/ assignments.</p> <ul style="list-style-type: none"> • A fairly good level of neatness and consistency to accomplish job activities. • Occasional support in completing the task/ job.
(b) Marks 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) Marks 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.

3. JOB ROLE

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: 7514.9900 –Fruits, Vegetables and Related Preservers, Others.

Reference NOS:

- | | |
|-------------|-------------|
| • FIC/N0103 | • FIC/N0122 |
| • FIC/N0203 | • FIC/N0204 |
| • FIC/N0111 | • FIC/N9406 |
| • FIC/N0204 | • FIC/N9407 |
| • FIC/N0118 | • FIC/N9408 |
| • FIC/N0111 | • FIC/N9409 |
| • FIC/N0202 | |

4. GENERAL INFORMATION

Name of the Trade	FRUITS AND VEGETABLES PROCESSING
Trade Code	DGT/1041
NCO - 2015	7514.9900
NOS Covered	FIC/N0103, FIC/N0203, FIC/N0111, FIC/N0204, FIC/N0118, FIC/N0111, FIC/N0202, FIC/N0122, FIC/N0204, FIC/N9406, FIC/N9407, FIC/N9408, FIC/N9409
NSQF Level	Level-3.5
Duration of Craftsmen Training	One Year (1200 Hours+150 hours OJT/Group Project)
Entry Qualification	Passed 10th class examination with Science and Mathematics or with vocational subject in same sector 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	Lab :- 96 Sq. m
Power Norms	5KW
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><u>Essential Qualification:</u> Relevant Regular / RPL variants of National Craft Instructor Certificate (NCIC) under DGT.</p> <p><u>Note:-</u>Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC</p>

	<i>qualifications. However both of them must possess NCIC in any of its variants.</i>
(ii) Employability Skill	<p>MBA/ BBA / Any Graduate/ Diploma in any discipline with Two years' experience with short term ToT Course in Employability Skills. (Must have studied English/ Communication Skills and Basic Computer at 12th / Diploma level and above)</p> <p style="text-align: center;">OR</p> <p>Existing Social Studies Instructors in ITIs with short term ToT Course in Employability Skills.</p>
(iii) Minimum Age for Instructor	21 Years
List of Tools and Equipment	As per Annexure – I

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

5.1LEARNING OUTCOMES

1. Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions. (NOS: FIC/N0103)
2. Identify and select fresh fruits and vegetables with the help of checklist. (NOS: FIC/N0203)
3. Identify spices and food additives by visual inspection. (NOS: FIC/N9406)
4. Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions. (NOS: FIC/N0203)
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. (NOS: FIC/N0103)
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. (NOS: FIC/N0103)
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. (NOS:FIC/N0111), (NOS: FIC/N0204)
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. (NOS: FIC/N0118)
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. (NOS: FIC/N0111)
10. Examine the tetra pack w.r.t to the materials of construction & dimension and its type. (NOS: FIC/N9407)
11. Explain and understand the process of wine preparation and canning process of fruits and vegetables and identify defect by physical observation and its causes in canned foods and explain food safety standards. (NOS: FIC/N0204)
12. Prepare synthetic vinegar by using appropriate tools and check the quality and explain other methods of vinegar production and its types. (NOS: FIC/N9408)
13. 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. (NOS: FIC/N0202, NOS/FIC/N0122)

14. Prepare fruits/ vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content. (NOS: FIC/N0204)
15. Check physical quality parameters in frozen market samples of frozen fruits and vegetables. (NOS: FIC/N9409)

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. (NOS: FIC/N0103)	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. (NOS: FIC/N0203)	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. (NOS: FIC/N9406)	Identify spices.
	Identify food additives.
4. Prepare and pack perishables for storage and then store under refrigerated conditions with safety precautions. (NOS: FIC/N0203)	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. (NOS: FIC/N0103)	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. (NOS: FIC/N0103)	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. (NOS: FIC/N0111, FIC/N0204)	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	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.

determine the moisture. (NOS: FIC/N0118)	
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. (NOS: FIC/N0111)	Maintain perfect hygiene standard.
	Select fruits.
	Prepare fruit.
	Prepare fruit juice for fruit jelly.
	Pectin test of fruit juice.
	Prepare jam/jelly/marmalades.
	Determine the end point for jam/jelly/marmalades.
	Identify the consistency for jam /jelly /marmalades.
10. Examine the tetra pack w.r.t to the materials of construction & dimension and its type. (NOS: FIC/N9407)	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.
	Maintain safety.
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. (NOS: FIC/N0204)	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.
	State the food safety standards.
12. Prepare synthetic vinegar by using appropriate tools and check the quality and explain other methods of	Maintain perfect hygiene standard.
	Prepare synthetic vinegar.
	Test and adjust pH and titrable Acidity of vinegar.
	Bottle the synthetic vinegar.
	Maintain safety.

vinegar production and its types. (NOS: FIC/N9408)	
13. 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. (NOS: FIC/N0202, NOS/FIC/N0122)	Maintain perfect hygiene standard.
	Select fruits/vegetables.
	Prepare fruit/vegetables.
	Prepare syrup.
	Test and adjust TSS content of syrup.
	Dry fruits/vegetables for candy.
	Crystallized.
	Pack and store.
	Maintain safety.
14. Prepare fruits/vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content. (NOS: FIC/N0204)	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. (NOS: FIC/N9409)	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)	Professional Knowledge (Trade Theory)
Professional Skill 40Hrs; Professional Knowledge 12Hrs	Identify the spoilage in fruits and vegetables and state the reason for the spoilage following safety precautions.	1. Spoilage of fruits and vegetables. 2. 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.
Professional Skill 20Hrs; Professional Knowledge 06Hrs	Identify and select fresh fruits and vegetables with the help of checklist.	3. 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.
Professional Skill 40Hrs; Professional Knowledge 12Hrs	Identify spices and food additives by visual inspection.	4. 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.
Professional Skill 45Hrs;	Prepare and pack perishables for storage and then	5. Study of common food processing equipment such as pulper, sealers, juice	Study of various equipment: usage, care/maintenance and precautions.

Professional Knowledge 12Hrs	store under refrigerated conditions with safety precautions.	extracting machines, autoclaves, corking machines etc.	
		6. Refrigeration and other methods for storing perishables.	Storage of fresh fruits and vegetable. Methods and containers used in fresh fruits and vegetable preservation.
Professional Skill 40Hrs; Professional Knowledge 12Hrs	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. 8. 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.
Professional Skill 40Hrs; Professional Knowledge 12Hrs	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. 10. Determination of Acids in fruits and vegetable products.	Fruit beverages: Squashes, syrups, nectars, RTS, crushes, cordial etc.
Professional Skill 45Hrs; Professional Knowledge 12Hrs	Prepare and preserve Tomato products by using appropriate machines such as pulper, autoclave, and corking machine with safety precautions, determine acidity	11. Preparation of tomato juices, puree, sauces, ketchups, soup, paste, chutney etc.	Tomato products: Technology of manufacture of tomato products.

	and TSS content.		
Professional Skill 45Hrs; Professional Knowledge 12Hrs	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.	Sun drying & dehydration and its merits and demerits. Principals involved preservation by drying method. Treatment prior to drying.
Professional Skill 40Hrs; Professional Knowledge 12Hrs	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.	Jams, nellies and marmalades: selection, preparation, production and preservation. Difference in between jam and jelly.
Professional Skill 40Hrs; Professional Knowledge 12Hrs	Examine the tetra pack w.r.t to the materials of construction & dimension and its type.	14. Practical demonstration of sealing pouching machine. 15. 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 labeling requirements.
Professional Skill 120 Hrs; Professional Knowledge 30Hrs	Explain and understand the process of wine preparation and canning process of fruits and vegetables and Identify defects	16. Demonstration of wine/Beverages preparation process in wine/Beverage industry and Visit to wine/Beverage industry.	Fermented beverages-wines.

	by physical observation & its causes in canned foods and explain food safety standards.		
Professional Skill 30Hrs; Professional Knowledge 12Hrs	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.	Different type of vinegar, methods of Vinegar Production.
Professional Skill 200 Hrs; Professional Knowledge 60Hrs	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.	Definition of preserves, candied fruits, glazed fruits, crystallized fruits- methods of preparation of these.
		19. 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.
		20. 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.
		21. Freezing demonstration on market sample of frozen fruits and vegetables.	Study of Frozen Fruits and Vegetables, Blanching and Freezing.
Professional Skill 50Hrs; Professional Knowledge 12Hrs	Prepare fruits/ vegetables pickles with oil/ salt/ vinegar/ spices, determine acidity content.	22. 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.
Professional Skill 45Hrs;	Check physical quality parameters in	23. Examination of processed products.	Study of Food safety Standards: HACCP, ISO22000, GMP, and

Professional Knowledge 12Hrs	frozen market samples of frozen fruits and vegetables.	24. Cleaning and maintenance of the equipments. 25. Detection of benzoic acid, Sulphur dioxide and KMS in fruits and vegetable products.	FSSAI. Importance of personal Hygiene, Cleaning & Sanitary standards in Fruits and Vegetable preservation. Good Handling Processes (GHP), Traceability aspects of processed product.
Industrial training in canning industry			

SYLLABUS FOR CORE SKILLS
1. Employability Skills (Common for all CTS trades) (120Hrs)

1. Employability Skills (Common for all CTS trades) (120Hrs)

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 / dgt.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.	Seam Checking gauge or screw gauge		01 no.
2.	Refractometers (Pocket)	0-32, 28-62, 58-92 Brix Sugar Scale	02 nos.
3.	Brinometer (Salinometer)		02 nos.
4.	PH Meter (Digital)		01 no.
5.	Pressure Cooker		02 nos.
6.	Juice Extractor (Screw type) 1 HP motor		01 no.
7.	Lime Juice Extractor & orange juice halving & Burring		01 no.
8.	Crown corking machine hand operated one.		01 no.
9.	Pilfer proof capping machine		01 no.
10.	Weighing balance	digital	03 nos.
11.	Cabinet dryer (electrical)		01 no.
12.	Stainless steel buckets or stainless buckets		06 nos.
13.	Electric Mixer		2 nos.
14.	Refrigerator double door	200 litre	01 no.
15.	Auto claves 20 lit cap		02 nos.
16.	Micrometer Seam Checking gauge' 0.001 LC		01 no.
17.	Oven (drying) (0-250 C) digital Display, with auto temperature controller, suitable insulated, fans, Heating elements.		01 no.
18.	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.

19.	Distilled water Assembly/water purifier with prefilter, activates charcoal / resin unit and UV exposure units. Complete with water supply tank and piping.		01 no.
20.	Fruit mill	junior model, 0.5 ton/hr with 1 hp motor	01 no.
21.	Solar dryer (cabinet type) complete with solar box. Size app 6'*3'		01 no.
22.	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.
23.	Deep Fridge	Temperature up to -40 C, auto temp controller	01 no.
24.	Mechanical peeler/ Batch type for fruit and vegetable peeling.		01 no.
25.	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.
26.	Baby Boiler/Diesel fuel/capacity of boiler as per capacity of steam jacket kettle.		01 no.
27.	Lidding machine for lidding of can/bottles		01 no.
28.	Sulphuring chamber 5 kg Capacity made up of wooden/Stainless steel, place for burning sulphur and exhaust.		01 no.
29.	Vacuum Bottle filling machine capacity 5kg/hrs, made up of stainless steel.		01 no.
30.	Bottle washer	With V2 HP motor, single	01 no.

		phase, two heads for brushes, water spray unit of 10-12 bottles.	
31.	Sealer for sealing of jars.		01 no.
32.	Shredder for slicing of fruit and vegetable capacity 5kg/hrs.		01 no.
33.	Sugar coating pan of stainless steel, revolving type with speed controller.		01 no.
34.	Improved Burner made up of Stainless Steel with proper safety measures with 24 Separate burner with 4 gas Cylinder.		01 no.
35.	Pickle mixer, Rotatory type and contact part of stainless steel.		01 no.
36.	Heat Sealing Machine Hand/Pedal Operated		01 no.
37.	VernierCalliper	15cm 0.01 mm LC	04 nos.
38.	Microscope		02 nos.
39.	Microwave oven		01 no.
40.	Fermenter		02 nos.
41.	Liquid filling machine	For filling liquid in bottles, 200ml, 500ml, 1000ml. Manually operated	01 no.
42.	Computer/Laptop/All in one for Faculty with Internet Connection with, colour Printer and photo copy Scanner or latest configuration.	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.
43.	LED multimedia Projector		01 no.
44.	UPS		As required
45.	A.C for Theory room/Lab		As required
B. CONSUMABLES TOOLS & ITEMS			

46.	Hydrometers of different ranges	0-30, 30-60, 60-90, Brix-hydrometer	01 no.
47.	Fruit Trays		08 nos.
48.	Stainless steel mugs		08 nos.
49.	Stainless steel bowls		08 nos.
50.	Thermometer (Digital)		06 nos.
51.	Sandashi (Tongs)		06 nos.
52.	Perforated spoons S.S.12"Length 4 " dia		06 nos.
53.	Coring knives		06 nos.
54.	Pitting knives		06 nos.
55.	Cutting knives		06 nos.
56.	Stainless steel knives		16pcs.
57.	Spoons of assorted size		16pcs.
58.	Stainless steel degches		6pcs.
59.	Can and cork Remover		As per Requirement
60.	Jell meters		6 nos.
61.	Stainless steel trays of assorted size		16 nos.
62.	Spoons, Wooden Ladle		16 nos.
63.	S.S.Vessels with lids 20 lit cap.		10 nos.
64.	S.S. Vessels with lids 6 lit cap.		06 nos.
65.	S.S.Vessels with lids 10 lit cap.		06 nos.
66.	Bottle Stand for 1 gross bottle		01 no.
67.	Stainless Steel Pricker		06 nos.
68.	Steel scale 12" Standard steel		04 nos.
69.	Lemon Squeezer		06 nos.
70.	Volume Measuring Stick		04 nos.
71.	Stainless Steel Strainer/Sieve		06 nos.
72.	Desiccator		03 nos.
73.	Moisture box	Aluminium, 100gm capacity.	02 nos.
74.	Continuous water supply		As required
75.	Beaker	50, 100, 250 ml, 500 ml	12 nos.
76.	Conical flask	50, 100, 250 ml, 500 ml	12 nos.
77.	Measuring cylinder	100ml, 250ml, 200 ml, 500ml,	12 nos.
78.	Measuring flask of assorted sizes		12 nos.
79.	Burrete of assorted sizes with Burrete stands		12 nos.
80.	Pipettes of assorted sizes		12 nos.

81.	Thermometer Digital	10°C to 110°C	16Pcs
82.	Rubber Gloves		12 pair for each trainee
83.	Aprons		01 for each trainee
84.	Jelly Filter bags		04Pcs
85.	Glass Funnels of assorted sizes		12 nos.
86.	Funnels 500ml. & 100ml. separating		12 nos.
87.	Test Tube With Test tube stand		25 nos.
88.	Glass rod		10 nos.
89.	Gas lighter		06 nos.
90.	Ph meter Rod		02 nos.
91.	Petri dish with cover		16 nos.
92.	Glass slides		16pcs.
93.	Refilling of gas cylinder for lab		As required
94.	Air tight glass container of different size		As required
C. CONSUMABLES ITEMS & CHEMICALS			
95.	Photo Copy Paper A4		As required
96.	Scale		As required
97.	Correcting Fluid pen		As required
98.	Dusting Cloth		As required
99.	Pen		As required
100.	Temporary marker		As required
101.	Stapler (Small & Big)		As required
102.	Puncher		As required
103.	Fevi stick		As required
104.	Stapler Pin		As required
105.	Ruled Register		As required
106.	File Folder		As required
107.	Vim Liquid		As required
108.	Dettol Hand wash		As required
109.	Scotch Bright		As required
110.	Colin		As required
111.	Aluminum Foils		As required
112.	Duster		As required
113.	Juna		As required
114.	Seasonal Fruits and Vegetables		As required

115.	Salt		As required
116.	Sugar		As required
117.	red chilly		As required
118.	black pepper		As required
119.	Dalchini		As required
120.	large elaychi		As required
121.	Jeera		As required
122.	Saunf		As required
123.	Laung		As required
124.	Vinegar		As required
125.	Butter		As required
126.	Hing		As required
127.	Methi		As required
128.	mustard oil		As required
129.	Glucose		As required
130.	food grade color		As required
131.	food grade flavour		As required
132.	Sodium Benzoate		As required
133.	Potassium met bisulphide		As required
134.	citric acid		As required
135.	Glacial Acetic acid		As required
136.	Other Chemicals/Raw material Require for Practical's		As required
137.	Tissue paper roll		As required
D: Furniture			
Class Room			
138.	Instructor Chair & Table with Glass		01 no.
139.	Magnetic White Board		01 no.
140.	Display Board		01 no.
141.	Table for computer/printer/scanner with chair		01 Set
142.	Dual Desk		12 nos.
Workshop / Lab			
143.	Working table with 6-3x21/2 Aluminum tops		05 no
144.	Stools		24 no
145.	Laboratory Table with rack and sinks	8'*2'-6"-6"	04 no

146.	Racks for keeping books (glass panel)etc.		01 sets
147.	Trainee Locker with space for 24		01 no
148.	Storage Rack for Chemicals		01 no
149.	Cup Board (large)		04 no
150.	First Aid Box		01 no
151.	Fire Extinguisher	Operate and test clinical equipment/ instruments used in hospital.	As per required
152.	Godrej Almirah		02 no
153.	Wooden Show Case For keeping & Display sample		02 no
154.	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			
1.	Dr D. C Sexana, Professor & HOD	Food Engineering and Tech. Dept, S.L.I.E.T, Longowal, Punjab	Chairman
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
12.	Priti Dwivedi, T.O.	Govt. I.T.I, Chindwara, Madhya Pradesh	Member
13.	Khurseed Jamal Siddique, T.O.	Govt. I.T.I, Chindwara, Madhya Pradesh	Member
14.	Sandhya Singh, T.O.	Govt. I.T.I, Chindwara, Madhya Pradesh	Member
15.	Ranjeeta Sharma, Principal	Maharashi Dayanand Institute of Tech. Jabalpur, M.P	Member
Mentor			
16.	J.P Meena, Director	DGET HQ, New Delhi.	Mentor
Members of Core Group			
17.	K.L.Kulli, JDT	CSTARI, Kolkata	Coordinator
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

