



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

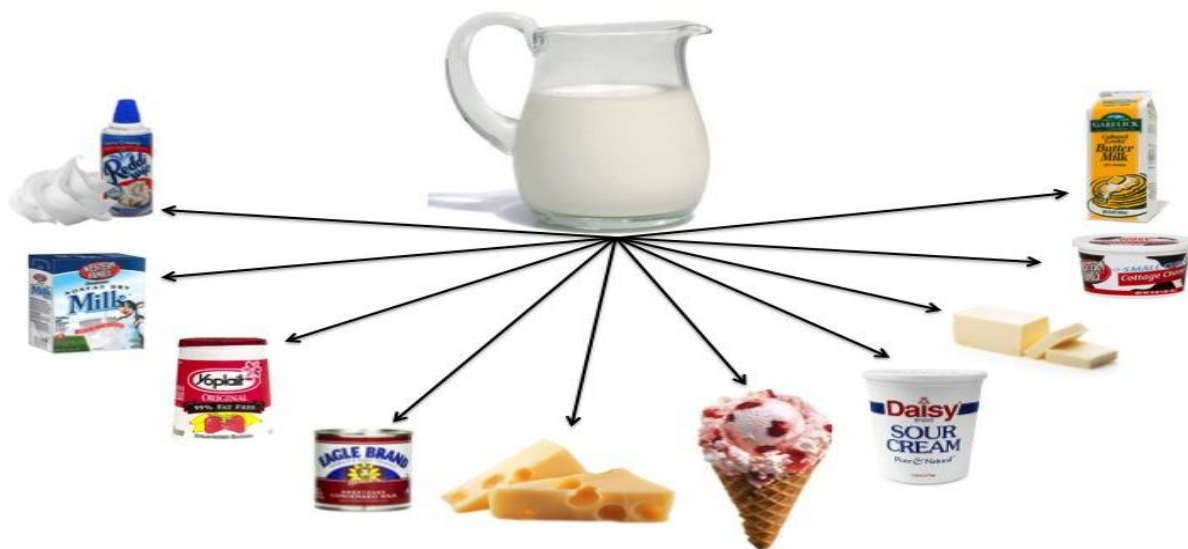
COMPETENCY BASED CURRICULUM

MILK & MILK PRODUCT TECHNICIAN

(Duration: One Year)

CRAFTSMEN TRAINING SCHEME (CTS)

NSQF LEVEL- 4



SECTOR – FOOD INDUSTRY



Directorate General of Training

MILK & MILK PRODUCT TECHNICIAN

(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

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	8
5.	Learning Outcome	10
6.	Assessment Criteria	11
7.	Trade Syllabus	13
	Annexure I (List of Trade Tools & Equipment)	20
	Annexure II (List of Trade experts)	23

1. COURSE INFORMATION

During the one-year duration of “Milk & Milk Product Technician” trade, a candidate is trained on Professional Skill, Professional Knowledge and Employability Skill related to 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 about elementary first-aid, firefighting, environment regulation and housekeeping, etc. The trainee identifies trade tools & equipment and milk operation process. He understands the importance of personal hygiene, cleanliness of Floor, equipment, milk products handling and hygiene protective clothing. He practices safe handling of dairy equipment and other tools. He identifies market of milk products and raw material of dairies. The trainee understands and practices different types of test of milk, estimate the fat and protein content of milk. Practice the test microbiological quality of milk by MBRT and SFC test.

The trainee learns to prepare, cream, ghee and butter, analyse the quality parameter and determine the effect of temperature in cream separation. He learns to make srikhand, dahi, mawa, channa, paneer, cheese, butter milk and milk cake. Trainees learn to prepare different qualities of available ice-cream available in market and evaluate its quality. Trainees learn to prepare dried milk and determine and analyse solubility index of dried milk. He applies HCCP, GMP in dairy plant. He performs washing of equipment used in dairy plant and sterilization of canes.

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.

‘Milk & Milk Product Technician’ 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. 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 Technician and will progress further as Senior Technician, Supervisor and can rise up to the level of Manager.
- Can become Entrepreneur in the related field.
- Can join Apprenticeship programme in different types of industries leading to 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 is being notified by 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	<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.

procedures and practices	<ul style="list-style-type: none"> • Little support in completing the task/job.
(c) Weightage in the range of more than 90% to be allotted during assessment	
<p>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.</p>	<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

Dairy Worker, General: performs all or several tasks in preparation of various dairy products. Pasteurises raw milk or other dairy product to remove harmful bacteria. Develops bacterial culture for use in making butter, buttermilk, cheese and other products. Separates cream from milk and churns it into butter. Curdles milk and converts curds into cheese. May make ice-cream.

Separator Man: Cream Separator; Cream man (Dairy) operates milk separator to separate cream from milk. Assembles and adjusts separator as necessary, according to type of product for which separated cream or milk is to be used; places empty containers below cream and skimmed outlets; pours milk into separator; switches on centrifugal machine which automatically carries milk into bowl and separates milk into fat and skimmed milk; regulates separator to obtain required percentage of cream for making butter or ghee; cleans plant using hot water, soda and other detergent solutions. May also attend to pasteurizing plant.

Butter Maker: performs all or several tasks for making butter. Pasteurizes milk to eliminate harmful bacteria. Separates cream from milk in centrifuge. Adds lactic ferment to ripen cream. Pours or pumps cream into mechanical churn. Starts churn to make butter, controlling butter moisture, temperature and time of churning. May add salt to butter in churn. May take samples of butter for testing. May boil and strain butter to make 'ghee' and be designated as Ghee maker.

Cheese Maker: cooks milk and specified ingredients to make cheese according to formula. Pasteurizes and separates milk to obtain prescribed butter fat content; turns valves to fill vat with milk and heat milk to specified temperature; starts agitator to mix ingredients; tests samples of milk for acidity and allows agitator to mix ingredients until specified level of acidity is reached; dumps and mixes measured amount of rennet into milk; stops agitator to allow milk to coagulate into curd; cuts curd or separates curd with hand scoop to release whey (watery part); observes thermometer, adjusts steam valve, and starts agitator to stir and cook curd at prescribed temperature for specified time; squeezes and stretches sample of curd with fingers and extends cooking time to achieve desired firmness or texture; scoops curd into burlap containers to drain off excess moisture; places cheese in moulds and presses it into shape. May salt cheese by immersing them in brine or roll cheese in dry salt, pierce or smear cheese with cultured wash to develop mould growth, and place or turn cheese blocks on shelves to cure cheese. May supervise ripening of cheese. May specialize in making particular type of cheese. May Pasteurise milk and operate centrifugal machine to separate cream out of pure milk.

Dairy Products Makers, Others; Dairy Workers (non-farm), Other include all other dairy workers not elsewhere classified, for example, those salting cheese by immersing them in brine

or by rubbing them with dry salt, sterilizing milk; operating machines which homogenise milk, moulding butter or cheese into shape, packing and wrapping butter with paper, making condensed or powdered milk, etc. and may be designated according to nature of work performed.

Reference NCO-2015:

- (i) 7513-0100 – Dairy worker/ general
- (ii) 7513-0200 - Separator man
- (iii) 7513.0300 - Butter Maker
- (iv) 7513.0400 - Cheese Maker
- (v) 7513.9900 - Dairy Products Makers, Others

4. GENERAL INFORMATION

Name of the Trade	Milk & Milk Product Technician
Trade Code	DGT/1116
NCO - 2015	7513.0100, 7513.0200, 7513.0300, 7513.0400, 7513.9900
NSQF Level	Level-4
Duration of Craftsmen Training	One Year (1600 Hours)
Entry Qualification	Passed 10 th class examination
Minimum Age	14 years as on first day of academic session.
Eligibility for PwD	LD, LC, DW, AA, LV, HH, DEAF, AUTISM, SLD, ID
Unit Strength (No. of Student)	24 (There is no separate provision of supernumerary seats)
Space Norms	96 Sq. m
Power Norms	6 KW
Instructors Qualification for:	
(i) Milk & Milk Product Technician Trade	<p>B.Voc/Degree in Dairy Technology from UGC recognized university with one year experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>Diploma (Minimum 2 years) in Dairy Technology from a recognized board of education or relevant Advanced Diploma (Vocational) from DGT with two-year experience in the relevant field.</p> <p style="text-align: center;">OR</p> <p>NTC/NAC passed in the trade of “Milk & Milk Product Technician” with three-year experience in the relevant field.</p> <p><u>Essential Qualification:</u> Relevant National Craft Instructor Certificate (NCIC) in any of the variants under DGT.</p> <p><i>Note: Out of two Instructors required for the unit of 2 (1+1), one must have Degree/Diploma and other must have NTC/NAC</i></p>

	qualifications. However, both of them must possess NCIC in any of its variants.		
(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) OR 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

5. LEARNING OUTCOME

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. Maintain hygiene and cleanliness of floor dairy equipment following safety precautions.
2. Operate machineries used in dairy plant and identify the basic milk product market and raw materials.
3. Perform various tests conducted on milk in dairy industries.
4. Handle different dairy equipments.
5. Prepare or assist in making Cream, Ghee & Butter products.
6. Prepare or assist to produce different milk products.
7. Prepare or assist in ice-cream making.
8. Prepare or assist in dried milk making.
9. Apply the milk safety rules as per standard norms.
10. Perform sterilization of milk container and carry out maintenance of dairy machineries.

6. ASSESSMENT CRITERIA

LEARNING OUTCOMES	ASSESSMENT CRITERIA
1. Maintain hygiene and cleanliness of floor dairy equipments following safety precautions.	Demonstrate safety practices to be observed in Trade.
	Demonstrate use of personal protective dresses.
	Demonstrate procedure to maintain personal hygiene, care of skin, hand, feet, food handlers etc.
	Demonstrate disposal procedure of effluent substances.
	Demonstrate use of hygienic protective clothing.
2. Operate machineries used in dairy plant and identify the basic milk product market and raw materials.	Identify commonly used raw material in dairy firm.
	Demonstrate the need of survey of market in milk product.
	Demonstrate and identify commonly used packaging of milk product.
	Demonstrate and identify the need of proper storage and packaging of milk product.
	Explain the causes of milk spoilages and prevention.
3. Perform various tests conducted on milk in dairy industries.	Demonstrate quality of milk.
	Demonstrate sampling, physical and chemical test of milk.
	Demonstrate estimation of fat of sample milk.
	Demonstrate protein content of milk.
	Demonstrate MBRT & SFC.
4. Handle different dairy equipments.	Demonstrate handling of different dairy equipment and care.
	Demonstrate single and two stage homogenizers.
	Demonstrate Pasteurisers different method eg. Batch, Flash and continues.
	Demonstrate drum and spray drier.
	Demonstrate on cream separator, cheese vat, deep freezer, jacket kettle, butter churner and boiler.
	Prepare pasteurized milk, UHT processing of milk
	Prepare flavored milk, toned milk, double toned milk and concentrated milk .
	Prepare fermented milk and Bulgarian milk.
5. Prepare or assist in making Cream, Ghee &	Plan and demonstrate Cream and Ghee preparation.
	Make plan for Butter preparation.

Butter products.	Plan and demonstrate the quality parameter Cream, Ghee & Butter.
	Demonstrate the temperature effect on the rate of cream separation.
	Able to pack the said dairy product and seal.
6. Prepare or assist to produce different milk products.	Prepare Srikhand & Dahi
	Prepare Mawa & Channa
	Prepare Paneer & Processed cheese.
	Prepare Buttermilk & Cake.
	Able to Pack the said dairy product and seal.
7. Prepare or assist in ice-cream making.	Prepare different types of commercially available ice-cream.
	Demonstrate the defects of commercial available ice-cream.
	Able to quality evaluation of ice-cream.
	Able to pack, seal and storage ice-cream.
8. Prepare or assist in dried milk making.	Plan & perform to prepare dried milk.
	Demonstrate to determinate solubility index if dried milk.
	Perform to quality check of dried milk as per the parameters.
	Able to pack, seal and storage dried milk.
9. Apply the milk safety rules as per standard norms.	Demonstrate application HACCP in dairy plant.
	Demonstrate application GMP in dairy plant.
	Demonstrate the dairy waste.
10. Perform sterilisation of milk container and carry out maintenance of dairy machineries.	Demonstrate washing dairy used equipments.
	Demonstrate CIP of dairy equipments.
	Demonstrate steam sterilization of canes
	Perform to maintain can washer.
	Chalk the lay out of dairy plant
	Understand the capacity of equipment
	Demonstrate the plant utility.

7. TRADE SYLLABUS

SYLLABUS FOR MILK & MILK PRODUCT TECHNICIAN TRADE			
DURATION: ONE YEAR			
Duration	Reference Learning Outcome	Professional Skills (Trade Practical) With Indicative Hours	Professional Knowledge (Trade Theory)
Professional Skill 30 Hrs; Professional Knowledge 06 Hrs	Maintain hygiene and cleanliness of floor dairy equipment following safety precautions.	Trade and Orientation <ol style="list-style-type: none"> 1. Visit to shop floor outfit and generate general ideas about the work atmosphere trade. (06 hrs) 2. Identify safety signs for danger, warning, caution & personal safety message and hygiene. (06 hrs) 3. Use of personal protective equipment (PPE). (03hrs) 4. Practice elementary first-aid.(03 hrs) 5. Preventive measures for electrical accidents & steps to be taken in such accidents.(06 hrs) 6. Use of Fire extinguishers. (02 hrs) 7. Importance of cleanliness, hygiene, sanitation in self life and milk product. (04 hrs) 	Familiarization with the working of Industrial Training Institute system. Importance of safety and precautions to be taken in the industry/shop floor. Introduction to PPEs. Introduction to First-Aid. Response to emergencies e.g. power failure, fire, and system failure. Importance of housekeeping & good shop floor practices. Occupational Safety & Health: Health, Safety and Environment guidelines, hygiene, legislations & regulations as applicable. Good Mfg. Practices. Good Hygiene Practices. (06 hrs.)
Professional Skill 90 Hrs; Professional Knowledge 18 Hrs	Operate machineries used in dairy plant and identify the basic milk product market and raw materials.	<ol style="list-style-type: none"> 8. Study of familiar Dairy Products and visit to market. (15hrs) 9. Visit to Milk Co-Op Society. (15 hrs) 10. Study of packaging equipment and machinery 	Status of dairy industries in India. Introduction of white revolution. Importance of dairy industry opportunities of employment in the Dairy Industry.

		<p>used in dairy industry. (30 hrs)</p> <p>11. Collection of various types of packaging material used for the packaging of dairy products. (15 hrs)</p> <p>12. Need and importance of packaging methods and storage conditions of dairy products. (15 hrs)</p>	<p>Overview of Food Spoilage: Bacterial and fungal food spoilage. Food poisoning, Food born infection and Food born intoxication.</p> <p>Main causes of milk spoilage. Preventions of milk and milk products from spoilage (Microbial spoilage) (18 hrs.)</p>
<p>Professional Skill 120 Hrs;</p> <p>Professional Knowledge 24 Hrs</p>	<p>Perform various tests conducted on milk in dairy industries.</p>	<p>13. Importance of cleanliness, hygiene, sanitation in self life and milk product. (10 hrs)</p> <p>14. Sampling of milk and milk products. (15 hrs)</p> <p>15. Perform physical examination of milk. (10 hrs)</p> <p>16. Perform platform tests of milk like organoleptic tests, clot on boiling test, alcohol test and acidity test.(15 hrs)</p> <p>17. Estimation of fat by Gerber method and Milk scan. (15 hrs)</p> <p>18. Estimation of specific gravity of milk by lactometer. (10 hrs)</p> <p>19. Estimation of SNF content in milk. (10 hrs)</p> <p>20. Practice to detection of various adulterants in milk. (15 hrs)</p> <p>21. Practice to perform ascertains microbiological quality of milk by MBRT and SPC and Qualiform. (20 hrs)</p>	<p>Definition of milk.</p> <p>Composition and physico-thermal property of milk</p> <p>Collection of raw milk. Method of Sampling of raw milk.</p> <p>Plat form test.</p> <p>Quality of raw milk. Different products made from the milk.</p> <p>Introduction to different dairy products useful for marketing.</p> <p>Principle and methods used for milk processing.</p> <p>General know how for microbiology of milk and milk products. (24 hrs.)</p>
Professional	Handle different	22. Care and maintenance of	Study and working of

<p>Skill 330 Hrs; Professional Knowledge 66 Hrs</p>	<p>dairy equipments.</p>	<p>equipments. (30 hrs) 23. Handling of equipments safely. (30 hrs) 24. Fault identification and removal of faults (30 hrs) 25. Corrective and Preventive action for safe operation. (10 hrs) 26. Data Recording. (10 hrs) 27. Preparation of pasteurized milk. (20 hrs) 28. Preparation of different types of Standard milk. (20 hrs) 29. Preparation of Toned milk. (20 hrs) 30. Preparation of Double toned milk. (30 hrs) 31. Preparation of Fermented milk. (30 hrs) 32. Preparation of Flavoured milk. (20 hrs) 33. Preparation of Condensed milk. (10 hrs) 34. Preparation of Concentrated milk. (10 hrs) 35. Preparation of Bulgarian milk. (10 hrs) 36. Preparation of Acidophilus milk. (15 hrs) 37. Practice on Store product hygienically. Conduct primary processing of market milk & store. (12 hrs) 38. Perform practice on Form fill seal machine. (13 hrs)</p>	<p>equipments used e.g. -Single and two stage homogenizers Batch, Flash, and Continues pasteurizer Spray Drier and Drum Drier. Evaporators (Different Type) Cream Separator. Deep freezer. Softy making machine. Ice cream freezer. Cheese vat. Jacket kettle. Butter churner. Boiler. Optionally mini dairy plant. Form fill seal machine. Centrifugal Machine. (24 hrs.) Principle of thermal processing of milk processing Pasteurization and Sterilizations of milk. UHT Processing of milk. Methods for production of different types of milks - pasteurized, standard, toned, double toned, flavoured milk. Ingredients of special milks, fermented milk, concentrated milk. Other dairy products like dried milk, condensed milk. Standards of milk and milk products. Condensed milk: Composition, production, and defects. Fermented dairy products: Production of Bulgarian milk, Acidophilus milk. (42 hrs.)</p>
<p>Professional</p>	<p>Prepare or assist in making Cream, Ghee</p>	<p>39. Preparation of Cream Ghee (30 hrs)</p>	<p>Cream: Composition, production and defects.</p>

<p>Skill 90 Hrs; Professional Knowledge 18 Hrs</p>	<p>& Butter products.</p>	<p>40. Preparation of Butter (10 hrs) 41. Analysis of various quality parameters of prepared dairy products as cream, butter and ghee. (20 hrs) 42. Packing the given dairy products and sealing and cost calculation. (30 hrs)</p>	<p>Different types of creams and their production method. Butter: Composition, method of production, theories of churning, grading and prevention of defects. Quality of butter. Ghee: Compositions, Different methods of Ghee production Quality of ghee. To study the effect of temperature on the rate of cream separation under the influence of gravity. (18 hrs.)</p>
<p>Professional Skill 270 Hrs; Professional Knowledge 54 Hrs</p>	<p>Prepare or assist to produce different milk products.</p>	<p>43. Preparation of Srikhand. (30 hrs) 44. Preparation of Dahi. (30 hrs) 45. Preparation of Mawa. (30hrs) 46. Preparation of Channa. (30 hrs) 47. Preparation of Paneer. (30 hrs) 48. Preparation Processed cheese. (30 hrs) 49. Preparation of Buttermilk. (30 hrs) 50. Perform Pack the given dairy products and seal. (30 hrs) 51. Study visit of various dairy plants. (30 hrs)</p>	<p>Cheese: Composition, types of cheese, production of cottage and cheddar cheeses; defects. Paneer: Composition, Production; defects. Indian dairy products: Rabri, kulfi, srikhand, lassi, Mawa, Dahi, Butter milk, Channa. Introduction of diff. types of packaging materials, packaging technology and method of packaging. (54 hrs.)</p>
<p>Professional Skill 90 Hrs; Professional Knowledge</p>	<p>Prepare or assist in ice-cream making.</p>	<p>52. Prepare different types of ice cream from a commercially available ice cream mix and to study defects in ice cream. (25</p>	<p>Principle of homogenization. Application of homogenization in dairy industry. Ice cream: Definition and composition, Role of</p>

18 Hrs		<p>hrs)</p> <p>53. Quality evaluation of ice cream. (25 hrs)</p> <p>54. Determine percentage overrun of commercially prepared ice-cream. (25 hrs)</p> <p>55. Pack the given dairy products and seal. Storage methods of ice-cream. (15 hrs)</p>	<p>ingredients used, Principles and Technology of ice-cream manufacturing, grading and prevention of defects in ice creams.</p> <p>Freezing method and equipment used. (18 hrs.)</p>
Professional Skill 60 Hrs; Professional Knowledge 12 Hrs	Prepare or assist in dried milk making.	<p>56. Demonstration on dairy products like Dried milk (spray dried and milk condensing plants). (30 hrs)</p> <p>57. Analysis of various quality parameters of prepared dried milk. Pack the given dairy products, seal and storage. (30 hrs)</p>	<p>Drying Theories, Dried milk: Definition and composition, production by drum drying and air spray system; defects; dried milk products–butter-milk powder, whey powder, cream powder, infant milk food. Drying Equipment: Spray Drier, Bag filter unit, Hepa filter, Evaporation plant (TVR/MVR) (12 hrs.)</p>
Professional Skill 30 Hrs; Professional Knowledge 06 Hrs	Apply the milk safety rules as per standard norms.	<p>58. Application of HACCP and GMP, GHP in a Dairy plant. Utilization of dairy industry wastes: Whey utilization; production. (25 hrs)</p>	<p>Food regulations : Overview of Food Safety and Standards Act, 2006 BIS, ISO-22000, Agmark, HACCP, International Food Standards GMP. Importance of personal Hygiene, Cleaning & Sanitary standards of dairy industry. (06 hrs.)</p>
Professional Skill 90 Hrs; Professional Knowledge 18 Hrs	Perform sterilization of milk container and carry out maintenance of dairy machineries.	<p>59. Washing of equipments used in dairy industry.(20 hrs)</p> <p>60. CIP of dairy equipments. (10 hrs)</p> <p>61. CIP of Bulk Milk Cooler. (10 hrs)</p> <p>62. Maintenance of Bulk Milk</p>	<p>Selection and use of dairy cleaners and sanitizers. Cleaning in place system (CIP), Various chemical used for CIP of dairy plant.</p> <p>Factor affecting washing operation</p> <p>General overview and knowhow</p>

		<p>Cooler.(20 hrs)</p> <p>63. Maintenance of crate-washer. (10 hrs)</p> <p>64. Industrial visit of utility and engg. Section of dairy plant. (20 hrs)</p>	<p>of utility section of dairy like refrigeration plant, air compressor units, ETP, Boiler and maintenance section.</p> <p>Energy efficiency and environmental protection. (18 hrs.)</p>
<p>Project work/ Industrial visit/prepare reports</p> <p>Broad Areas:</p> <ul style="list-style-type: none"> a. Preparation of srikhand b. Preparation of dahi c. Preparation dried milk d. Preparation of paneer e. Preparation of butter milk 			

SYLLABUS FOR CORE SKILLS

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

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			
MILK & MILK PRODUCT TECHNICIAN (For batch of 24 Candidates)			
S No.	Name of the Tools and Equipment	Specification	Quantity
A. List of Equipment			
1.	Mini dairy plant: Complete Mini- processing unit for milk.		1 No.
2.	Milk Chiller for chilling milk	Up to a temperature of about – 10 °C	1 No.
3.	Milk cans	Made of steel/ Aluminium, 40 – 100 lit capacity	As required
4.	Cream separator	Motor operated, Centrifugal, capacity up to 1-2 Kg/ cream per min.	1 No.
5.	Cheese vat	Made of heavy Stainless steel (306), size approx. 4'X 2.5'X 1' with proper outlet and taps	1 No.
6.	Plate pasteurizer (Lab model)		1 No.
7.	Butter churner		1 No.
8.	Boiler (Lab scale)		1 No.
9.	Deep fridge		1 No.
10.	Steam jacketed kettle with surface scrapper		1 No.
11.	Mawa machine		1 No.
12.	Crown corking machine		1 No.
13.	Form fill seal machine		1 No.
14.	Centrifuge : For Fat estimation in milk,		1 No.
15.	Ice-cream plant		1 No.
16.	Gerber tubes for fat estimation		1 No.
17.	Electric oven		1 No.
18.	Desiccators		2 nos. each
19.	Weight balances Digital	min 10 gm to max 5 kg	5 Nos.
20.	Jacket Kettle		5 Nos.
21.	Flash evaporator.		1 No.
22.	Can body reformer		1 No.

23.	Can seamer		1 No.
24.	Exhaust box		1 No.
25.	Cup sealer		1 No.
26.	Vacuum pan		1 No.
27.	Vernier caliper : 15 cm. 0.01 mm LC		2 Nos.
28.	Screw Gauge : Micrometer,	0.001 mm LC,10 cm cap	4 Nos.
29.	Steel scale	12 " standard	2 Nos.
30.	Steel Measuring tape	Scales 1 meter, and of 50 ft	2 Nos.
31.	Weight balances Digital	min 0.01gm to max 1kg	1 No.
32.	Cutting equipments : Different knives,		As required
33.	Sinks : standard size		1 No.
34.	Hot plate : Electrical	2 KW	1 No.
35.	Spray drier (Lab Scale)		1 No.
36.	Heat sealing machine : Hand / pedal operated		1 No.
37.	Tanks SS	50 litres capacity, cylindrical with cap	1 No.
38.	Syrup tanks	50, 100 lit capacity SS	1 No.
39.	Pressure cooker Stainless Steel	5 Kg and 10 Kg	1 No. each
40.	Liquid filling machine : For filling liquid in bottles, 200 ml, 500 ml, 1000 ml. Manual		As required
41.	SS filter : Sieve type cloth filter, hydraulic		1 No.
42.	Sugar Coating pan : SS, Revolving type with speed control		1 No.
43.	Bottle opener : Heavy duty, Stainless Steel		1 No.
44.	Burette with stand : 50 ml ordinary glass		1 No.
45.	Pipette : 5-50 ml capacities, glass		As required
46.	Lab glassware's : Different sizes and types		As required
47.	Working tables : Stainless Steel Size 6' X 3'		1 No.
48.	Improved stoves : Made of MS with proper safety Measures, Valves etc		1 No.
49.	Stainless steel / Aluminium pots	Different Capacities	1 No.

50.	Wooden spoons : Different sizes		As required
51.	Bulk Milk Cooler	Suitable capacity	1 No.
52.	Automation Skid - Small PLC and SCADA sys. - Variable frequency drive - Soft Starter - level switch, level transmitter, flow switch, flow transmitter - Pressure switch, pressure transmitter	Suitable Integration Cap.	1 No.
B. Shop Floor Furniture and Materials (For 2 (1+1) units no additional items are required)			
53.	Instructor's table		1 No.
54.	Instructor's chair		2 Nos.
55.	Metal Rack	100cm x 150cm x 45cm	4 Nos.
56.	Lockers with 16 drawers standard size		2 Nos.
57.	Steel Almira	2.5 m x 1.20 m x 0.5 m	2 Nos.
58.	Black board/white board	12' x 4'	2 No. (one for lab and one classroom)
59.	Fire Extinguisher		2 Nos.
60.	Fire Buckets		2 Nos.
61.	Classroom furniture (dual desk)		12 Nos.
62.	Lab tables (Work bench)		6 Nos.
63.	Stools for lab		24 Nos.
<p>Note: -</p> <ol style="list-style-type: none"> 1. All the tools and equipment are to be procured as per BIS specification. 2. 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 Members contributed/ participated for finalizing the course curriculum of Milk & Mild Product Technician trade held on 20.02.2018 at ITI Tarsali, Vadodara.			
S No.	Name & Designation Sh./Mr./Ms.	Organization	Remarks
1.	Laxmi Das Hindocha Managing Director	Transpek Industries Ltd. Vadodara	Chairman
2.	S. A. Pandav RDD, Vadodara	DET Gujarat	Member/ Coordinator
3.	Nikunj Kumar R. Patel	Baroda, Dairy, Vadodara	Member
4.	Nirmal N. Patel	Baroda, Dairy, Vadodara	Member
5.	Birendra Kumar Manager (Production)	Vidya Dairy, Anand	Member
6.	Ajay M. Zala Dy. Manager (Dairy)	Vidya Dairy, Anand	Member
7.	M. G. Meghani OSD	KDCMPU Ltd., Anand	Member
8.	Mayank I. Patel Dy. Manager	KDCMPU Ltd., Anand	Member
9.	Hiren J. Purohit HR Officer	Laxmi Cukezone Pvt. Ltd., Anand	Member
10.	Harun Saiyad Store Incharge	Laxmi Cukezone Pvt. Ltd., Anand	Member
11.	R. S. Kate, Sales Head	R. K. Foods, Tarsali, Gujarat	Member
12.	Jitendra, Manager	Dungee Dum Ltd., Tarsali, Gujarat	Member
13.	Y. B. Joshi, Pricipal	ITI Khambat, Gujarat	Member
14.	Anil Kahiv AGM (Production)	Bhopal Dugdhd Sangh, Habinganj, Bhopal	Expert
15.	Ajay Sirohi Mangar (Production)	Bhopal Dugdhd Sangh, Habinganj, Bhopal	Expert
16.	Amit Saxena, Manager	Bhopal Dugdhd Sangh, Habinganj, Bhopal	Expert

17.	P. K. Choudhary, Technician	Bhopal Dugdh Sangh, Habinganj, Bhopal	Expert
18.	Harigopal, Technician	Bhopal Dugdh Sangh, Habinganj, Bhopal	Expert
19.	Ashoke Rarhi, DDT	CSTARI, Kolkata	Member/ Coordinator
20.	K.V.S. Narayana Training Officer	CSTARI, Kolkata	Member/ Coordinator



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



Industrial Training Institute

Milk & Milk Product Technician

