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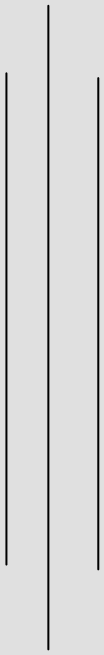
Dairy Product /Sweets Maker



Council for Technical Education and Vocational Training

Curriculum Development Division

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Introduction

The competency based market oriented curriculum for **Dairy Product Maker and Sweets Maker** is designed to produce employable workforce equipped with knowledge, skills, and attitudes related to dairy product and sweets making occupation. Once the trainees acquire these competencies they will have ample opportunity for wage employment and self-employment through which they will contribute in the national streamline of poverty reduction in the country.

Aim

The main aim of this program is to produce employable skilled dairy products and sweets makers who will provide dairy products and sweet making services in the dairy and sweets making industries in the country.

To produce such human resources through institutional training program followed by "On the Job Training (OJT)" is made mandatory. This provision provides the trainees the opportunity for maximum experience & exposure of "The World of Work."

The graduates of this program will be able to be employed or be an entrepreneur.

Objective

After completion of training the trainees will be able:

- To be familiar with basic milk processing technology
- To process milk products
- To perform dairy laboratory tests
- To prepare mother culture for milk products
- To prepare khoa based milk sweets
- To prepare chhana based milk sweets.
- To prepare cultured/fermented mik products
- To prepare milk based puddings / desserts

Course Description

This curriculum is based on the job required to be performed by a dairy products and sweets making technical worker. Therefore, this curriculum guide is designed to equip the trainees with skills & knowledge of the field of dairy based products and sweets making technology. This curriculum is designed in modular approach. Module one consists of milk based products. Module two comprises of processing and production of sweets items. The provision of On-the- Job Training (OJT) is included to provide the trainees the opportunities to have experience and exposure of "The World of Work" as well as practice the critical competencies. OJT commences after the completion of in- house training.

The duration of particular modules will be as mentioned in the course structure. There will be demonstration by instructors/trainers and the opportunity to practice skills/tasks necessary for this level of technicians. Trainees will practice & learn skills using typical tools, equipment, machines, and materials necessary for the program.

Duration

The total duration of this training program will be of 550 hours [390 hours in house and 160 hours OJT].

Target Group

The target group for this training program will be school leavers having minimum of class seven educations. Priority will be given to the individual of rural, poor, and disadvantaged groups (DAGs).

Target location

The target location for this training program will be all over Nepal.

Group Size

The group size for this training program will be maximum 30, provided all necessary resources to practice the tasks/ competencies as specified in this curriculum.

Medium of Instruction

The medium of instruction for this program will be Nepali or English or both

Pattern of Attendance

The trainees should have 80% attendance in theory classes and 90% in practical/ performance to be eligible for internal assessments and final examinations.

Focus of Curriculum

This is a competency-based curriculum. This curriculum emphasizes on competency performance. 80% time is allotted for performance and remaining 20% time is for related technical knowledge. So, the main focus will be on performance of the specified competencies in this curriculum. The provision of OJT is made to practice the critical tasks during the stated period.

Entry Criteria

Individuals who meet the following criteria will be allowed to enter into this program:

- Minimum of seven class pass
- Minimum of 15 years of age
- Should pass entrance examination

Instructional Media and Materials

The following instructional media and materials are suggested for the effective instruction and demonstration.

- ***Printed Media Materials*** (Assignment sheets, Case studies, Handouts, Information sheets, Individual training packets, Procedure sheets, Performance Check lists, Textbooks etc.).
- ***Non-projected Media Materials*** (Display, Models, Flip chart, Poster, Writing board etc.).
- ***Projected Media Materials*** (Opaque projections, Overhead transparencies, Slides etc.).
- ***Audio-Visual Materials*** (Audiotapes, Films, Slide-tape programs, Videodiscs, Videotapes etc.).
- ***Computer-Based Instructional Materials*** (Computer-based training, Interactive video etc.).

Teaching Learning Methodologies

The methods of teachings for this curricular program will be a combination of several approaches. Such as Illustrated Lecture, Group Discussion, Demonstration, Simulation, Guided practice, Practical experiences, Fieldwork and Other Independent learning.

- Theory: Mini talk, Discussion, Assignment, Group work.
- Practical: Demonstration, Observation, Guided practice and Self-practice.
- OJT

Follow up Provision

- ***First follow up***: Six months after the completion of the program
- ***Second follow up***: Six months after the completion of the first follow up
- ***Follow up cycle***: In a cycle of one year after the completion of the second follow up for five years

Grading System

The trainees will be graded as follows based on the marks in percentage secured by them in tests/ evaluations.

- Distinction: Passed with 80% or above
- First Division: passed with 75% or above

- Second Division: passed with 65% or above
- Third Division: passed with 60% or above

Trainees Evaluation Details

- Continuous evaluation of the trainees' performance is to be done by the related instructor/ trainer to ensure the proficiency over each competency under each area of the whole course.
- Related technical knowledge learnt by trainees will be evaluated through written or oral tests as per the nature in the institutional phase of training.
- Trainees must secure minimum marks of 40% and 60% in theory and practical evaluations respectively.
- There will be three internal evaluations and one final evaluation of the whole course.
- The ratio between internal and final examination of knowledge test will be 20:80 but for the performance test it will just reverse.
- The entrance test will be administered by the concerned training institute.
- The OJT will be evaluated according to the OJT details stated in the curriculum

Trainers' Qualification (Minimum)

- Diploma in Dairy Science or equivalent in related field
- Good communicative and instructional skills
- Experience in related field

Trainer-Trainees Ratio

- In theory classes 1(trainer): 20 (trainees)
- In practical classes (in workshop and laboratory) 1(trainer): 10 (trainees)

Suggestions for Instruction

1. **Select Objective**
   - Write Objective of cognitive domain.
   - Write Objective of psychomotor domain.
   - Write Objective of affective domain
2. **Select Subject matter**
   - Study subject matter in detail.
   - Select content related to cognitive domain.
   - Select content related to psychomotor domain.
   - Select content related to affective domain.
3. **Select Instructional Methods**
   - Teacher centered methods: like lecture, demonstration, question answers inquiry, induction and deduction methods.
   - Student initiated methods like experimental, field trip/excursion, discovery, exploration, problem solving, and survey methods.
   - Interaction methods like discussion, group/team teaching, microteaching and exhibition.
   - Dramatic methods like role play and dramatization
4. Select Instructional method (s) on the basis of Objective of lesson plans and KAS domains.
5. Select appropriate educational materials and apply at right time and place.
6. Evaluate the trainees applying various tools to correspond the KAS domains.
7. Make plans for classroom / field work / workshop organization and management.
8. Coordinate among Objective, subject matter and instructional methods.
9. Prepare lesson plan for theory and practical classes.
10. Deliver /conduct instruction / program.
11. Evaluate instruction/ program.

Special suggestion for the performance evaluation of the trainees

1. Perform task analysis.
2. Develop a detail task performance checklist.
3. Perform continuous evaluation of the trainees by applying the performance checklist.

Suggestion for skill training

1. Demonstrate task performance in normal speed.
2. Demonstrate slowly with verbal description of each and every step in the sequence of activity of the task performance using question and answer techniques.
3. Repeat 2 for the clarification on trainees demand if necessary.
4. Perform fast demonstration of the task.

Provide trainees the opportunities to practice the task performance demonstration

1. Provide opportunity to trainees to have guided practice.
2. Create environment for practicing the demonstrated task performance.
3. Guide the trainees in each and every step of task performance.
4. Provide trainees to repeat and re-repeat as per the need to be proficient on the given task performance.
5. Switch to another task demonstration if and only trainees developed proficiency in the task performance.

Other suggestions

1. Apply principles of skill training.
2. Allocate 20% time for theory classes and 80% time for task performance while delivering instructions.
3. Apply principles of learning relevant to the learner's age group.
4. Apply principles of intrinsic motivation.
5. Facilitate maximum trainees' involvement in learning and task performance activities.
6. Instruct the trainees on the basis of their existing level of knowledge, skills and attitude.

Certificate Requirements

The related training institute will provide the training certificate of **"Dairy Product /Sweets Maker"** based on the prescribed in-house training and related OJT completed as per the model of the curriculum. However; individuals who complete Module (s) of the institutional training will receive the certificate of the particular module completed.

Provision of Skill Testing

The graduates who have completion certificate of **Dairy Product/Sweets Maker** may sit in the skill testing examination **Level one (Level- 1)** as provisioned and administered by the National Skill Testing Board.

Course Structure of Dairy Product /Sweets Maker

S.N.	Modules and sub-modules	Nature	Total hours	Full marks
1	**Dairy Product Maker** 1. Basic Milk Processing Technology 2. Processing of Milk Products 3. Laboratory Tests	T+P	200	150
2	**Sweets Maker** 1. Khoa Based Milk Sweets 2. Chhana Based Milk Sweets 3. Cultured / Fermented Products 4. Milk Based Puddings / Desserts	T+P	190	150
	In-house total		**390**	**300**
5	On-the-Job Training (1 month)	P	160	100
	Grand total		**550**	**400**

Module: 1: Dairy Product Maker

Description:
This module consists of the knowledge and skills related to dairy products making. This module provides skills and knowledge related to basic milk processing technology, processing of milk products, and laboratory tests.

Objective:
After completion of this module the trainees will be able:

- To perform basic milk processing
- To perform processing of various milk products
- To perform various laboratory tests related to dairy

Sub-modules:

- Basic Milk Processing Technology
- Processing of Milk Products
- Laboratory Tests

Module Structure

S.N.	Sub-modules	Nature	Total hours	Full marks
1	Basic Milk Processing Technology	T+P	200	150
2	Processing of Milk Products	T+P		
3	Laboratory Tests	T+P		
	Total		**200**	**150**

Note: Trainers are suggested to specify theory and practical hours for each task based on the ratio of 20: 80.

Module: 1

Sub-module:1: Basic Milk Processing Technology

Description:

This sub module consists of knowledge and skills related to basic milk processing technology. It consists of tasks related to milk processing of milk. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance of the task.

Objective:
After its completion of this module the trainees will be able:

- To develop the concept of milk and its composition
- To describe physical properties of milk
- To prepare for milk reception & processing
- To pre heat and separate the cream
- To reconstitute & Recombine milk
- To homogenize the milk
- To pasteurize milk & cream
- To store the pasteurized milk
- To fill up milk
- To cool storage the filled pouches
- To clean/sanitize the dairy equipment

Tasks:

1. Develop the concept of milk and its composition
2. Describe physical properties of milk
3. Prepare for milk reception & processing
4. Pre heat and separate the cream
5. Reconstitute & Recombine milk
6. Homogenize the milk
7. Pasteurize milk & cream
8. Store the pasteurized milk
9. Fill up milk
10. Cool storage the filled pouches
11. Clean/sanitize the dairy equipment

Task Structure

TASK NO. 1 Develop the concept of milk and its composition.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive Instructions 2. Define milk 3. Study the composition of cow, buffalo, human and goat milk. 4. Enlist the importance of different ingredients of milk.	**Condition(Given):** Related books, manuals and supplies **Task (What):** Develop the concept of milk and its composition **Standard (How well):** The concept and its composition of different species of milk developed.	• Definition of milk • Composition of milk • Importance of different ingredient of milk • Milk and colostrums • Type of milk suitable for different products • Curdling of milk • Flavor defects of milk

Tools/equipment:
Safety:

Task Structure

TASK NO. 2 Describe physical properties of milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive Instructions 2. Explain appearance of milk. 3. Explain flavor of milk. 4. Define pH & acidity of milk. 5. Define density of milk. 6. Define viscosity & surface tension of milk. 7. Define boiling & freezing point of milk. 8. Explain specific heat, salt balance, heat stability of milk.	**Condition(Given):** Related books, manuals and supplies **Task (What):** Describe physical properties of milk. **Standard (How well):** Common physical properties of milk described	• Physical properties of milk • pH value • Acidity • Density of water & other liquid • Importance of specific heat, salt balance • Importance of boiling & freezing point of any liquid

Tools/equipment:
Safety:

Task Structure

TASK NO. 3 Prepare for milk reception & processing.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Perform the sensory & platform test of the raw milk . 4. Draw the sample from the raw milk. 5. In case of milk from storage tank first run the agitator of each storage tank having raw milk to be processed. 6. Draw the sample from the bulk milk. 7. Get the result after fat, SNF & COB test from laboratory. 8. Get the requirement of the pasteurized milk & milk products from marketing department. 9. Plan the production for each product. 10. Calculate the amount of fat to be separated. 11. Calculate the amount of SMP to be added.	**Condition(Given):** Necessary tools, equipments and materials. **Task (What):** Prepare for milk reception & processing.. Plan for milk processing **Standard (How well):** Milk production planned and prepared as per raw milk available	• Plan for milk processing • Preparation for milk • processing • Bulk sampling • Related calculations • Pearson's square for • Standardization of milk. • Plate form test

Tools/equipment:
Safety:

Task Structure

TASK NO. 4 Pre heat and separate the cream

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Test the C.O.B. of the milk. 4. Clean the batch pasteurizer. 5. Pour the milk into the batch pasteurizer. 6. Open the steam or hot water. 7. Run the agitator. 8. Raise the temperature to 45-50 degree Celsius. 9. Assemble the separator. 10. Pass the milk through the separator. 11. Collect the cream & skim milk separately.	**Condition(Given):** Milk to be preheated to separate cream **Task (What):** Preheat & separate the cream. **Standard (How well):** Milk preheated & cream Separated. having less than 0.5% fat in skim milk.	• Concept of pre heating • Operation of batch pasteurizer • Assembling of cream separator • Fat testing of skim milk. • Calculation for fat to be separated • Procedure of pre heating

Tools/equipment: Cream separator, Batch pasteurizer

Safety:

1. Don't run the separator without liquid.
2. Don't open the separator unless the bowl completely stops.

Task Structure

TASK NO. 5 Reconstitute & Recombine milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials 3. Calculate the quantity of SMP or WMP required. 4. Get the Luke warm water or milk in mixing vessel/batch pasteurizer. 5. Connect the mixing hoper & pump. 6. Cut the powder bag. 7. Start the pump. 8. Put the SMP/WMP into the mixing hoper. 9. Disconnect the pump & hoper when all powder is mixed.	**Condition(Given):** Skim milk powder/ whole milk powder to be reconstituted/recombined to fulfill the requirements of milk solid. **Task (What):** Calculate the required quantity of milk & mix with water or milk. **Standard (How well):** Powder mixed with water or milk & tested to get required composition. The product tested to confirm the required combination to th accuracy of 98%.	• Concept of reconstitution and recombination of milk • Judging the quality of powder • Calculating the needed quantity of powder • Composition of milk powder • Solubility of milk powder. • Procedure of reconstitution and recombination

Tools/equipment: Powder mixing hoper, milk pump, storage tank/batch pasteurizer.
Safety:
1. Do not use cold water for mixing the powder.
2. Cut and put the powder bag upside down into the hoper.

Task Structure

TASK NO. 6 Homogenize the milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Open the water supply in the piston chamber. 4. Run & sanitize the homogenizer. 5. Heat the milk to 65-70 deg. Celsius. 6. Pass the milk through homogenizer. 7. Increase the pressure as required. 8. Collect the homogenized milk separately. 9. Release the pressure when all milk is homogenized. 10. Clean the homogenizer with water, lye solution & again with hot water.	**Condition(Given):** Whole milk and high pressure homogenizer **Task (What):** Homogenize the milk. **Standard (How well):** Milk homogenized to get uniform size of fat globules so as to decrease the cream layer formation.	• Concept of milk homogenization • Proper temperature & pressure required for the product to be homogenized. • Principles of homogenization • Construction and working of homogenizer. • Homogenization procedure

Tools/equipment: Homogenizer with pressure adjustment knob and pressure gauge.
Safety:
1. Open water supply on piston before starting the homogenizer.
2. Increase the homogenizing pressure slowly

Task Structure

TASK NO. 7 Pasteurize milk & cream

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Test the clot on boiling test of the milk. 4. Clean & sanitize the pasteurizing equipment & pipe lines. 5. Open the water/steam as per requirement of the pasteurizing Equipment. 6. Raise the temperature up to 65 deg. Celsius for milk & 80 deg Celsius in case of batch pasteurizer for cream & hold for 30 minutes. 7. Drain the hot water & open tape water & the chilled water to cool down to 4 deg. Celsius. 8. Raise the temperature to 75 deg. Celsius for milk in case of plate heat exchanger & 85 deg .Celsius for cream. 9. Cool to 4 deg. Celsius for milk & 10 deg .Celsius for cream.	**Condition(Given):** Raw milk/cream to be pasteurized and batch pasteurizer/plate heat exchanger. **Task (What):** Pasteurize milk & cream **Standard (How well):** Milk & cream pasteurized meeting food act standard of Nepal.	• Concept of pasteurization • Operation of pasteurizing equipment • Nepal food act standard pasteurized milk/cream. • Different methods of pasteurization • Different types of equipments used for pasteurization • Purpose and benefit of pasteurization • Procedure of pasteurization

Tools/equipment: Pasteurizing equipment

Safety:

1. Observe personal hygiene.
2. Check the operation of flow diversion valve.(FDV)

Task Structure

TASK NO. 8 Store the pasteurized milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Clean & sanitize the insulated storage tank. 3. Circulate the pasteurized chilled water to lower down the temperature of inner chamber. 4. Put the pasteurized milk in the storage tank at or below 4 deg Celsius. 5. Note down the temperature of the milk . 6. Use the milk by next day.	**Condition(Given):** Pasteurized milk and store **Task (What):** Store the pasteurized milk. **Standard (How well):** Pasteurized milk stored in hygienically safe condition.	• Concept of milk re-standardization • Construction of the milk storage tank • Storage temperature • Cleaning procedure for storage tanks

Tools/equipment: Insulated storage tank made of stainless steel inside fitted with agitator and thermometer.
Safety: Use the milk by next day

Task Structure

TASK NO. 9 Fill up milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Check the condition of the filling machine. 4. Sanitize the filling machine. 5. Check whether UV rays is in working condition. 6. Place the rill of polythene film at proper place in the machine. 7. Draw & adjust the film. 8. Check the vertical & horizontal sealing element. 9. Replace the Teflon tape if required. 10. Adjust the sealing temperature. 11. Start the machine & open the valve for milk. 12. Check the size of the pouch & weight/volume of the milk. 13. Clean & sanitize the machine when filling is completed.	**Condition(Given):** Pasteurized milk to be filled & packed in polythene pouch using form fill & seal machine **Task (What):** Fill in the pasteurize milk in ½ litre or 1 litre poly pouch. **Standard (How well):** Pasteurized milk is filled & sealed without post contamination in pouches of 500ml or 1000ml with less than 1% accuracy.	• Construction of the filling machine • Operation of the filling machine • Quality of polythene film used for milk filling • Testing of polythene film • Procedure of filling up

Tools/equipment: FFS machine, weighing balance, milk crate.
Safety:
1. Always shut the door while operating the machine
2. Do not insert finger or hand in between the sealing jaw while machine is running.

Task Structure

TASK NO. 10 Cool storage the filled pouches.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Clean the floor of the cold store. 3. Set the cold store temperature at 4 deg. Celsius (cut off at 2 deg .Celsius & start at 6 deg .Celsius). 4. Put the filled pouches in crate, 20 pouches in each crate. 5. Stack the crate up to 8 crate, depending upon the height of the cold store. 6. Store the milk crates in rows leaving sufficient space in between to facilitate movement and air flow. 7. Count the number of stock, crate, & milk pouches. 8. Record the quantity.	**Condition(Given):** Pasteurized filled milk is to be stored so as to protect from spoilage/ quality degradation & easy countable. **Task (What):** Cool storage the filled pouches **Standard (How well):** Filled milk pouches stored in safe & easy Countable condition.	• Operation of cold store. • Temperature adjustment

Tools/equipment:. Milk crates, Crate trolley
Safety: Don't stack crate too high

Task Structure

TASK NO. 11 Clean / sanitize the dairy equipment

Performance Step	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Collect necessary tools, equipment and materials. 3. Thoroughly rinse the equipments with clean cold water in order to remove loose dirt. 4. Prepare 0.8 to 1.0 percent of the alkaline detergent solution in warm water in a wash-up tank and maintain the temperature at about 50 o c. 5. Introduce the detergent solution into the equipment. Thoroughly brush the equipment surface, inside and outside with a clean brush. 6. Wash the utensil with enough fresh cold water, using a clean brush again if needed, to remove all traces of detergent. 7. Sanitize the equipment by steam or hot water after cleaning and /or by rinsing with chlorine solution (200ppm)	**Condition (Given):** Two compartment wash-up tank, one for warm detergent solution and other for hot water together with steam jet. Fresh detergent and sanitizers. **Task (what):** Clean / sanitize dairy equipment **Standards (How well):** Dairy equipments cleaned and sanitized with the removal of soil from the surface and destruction of all pathogen and almost all non pathogenic microorganisms. Dairy equipments has been cleaned and sanitized as per the standard.	• Concept of cleaning. • Concept of sanitization. • Selection of detergents and sanitizers.

Tools, Equipments: Two compartment wash-up tank, clean brushes.
Safety: Use rubber gloves to avoid skin injury from detergent.

Module: 1

Sub-module: 2: Processing of Milk Products

Description
This sub module consists of knowledge and skills related to processing of milk products. It consists of tasks related to milk products processing. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance of the task.

Objective:
After its completion of this module the trainees will be able:

- To produce plain butter
- To produce table butter
- To produce Ghee from butter.
- To produce Yogurt/Dahi
- To produce Lassi.
- To produce Sikarni
- To produce paneer.
- To produce Chhana
- To produce Khoa
- To produce Ice – cream
- To produce sterilized milk.

Tasks:

1. Produce plain butter
2. Produce table butter
3. Produce Ghee from butter.
4. Produce Yogurt/Dahi
5. Produce Lassi.
6. Produce Sikarni
7. Produce paneer.
8. Produce Chhana
9. Produce Khoa
10. Produce Ice – cream
11. Produce Sterilized milk.

Task Structure

TASK NO. 1 Produce plain butter.

Steps	Terminal Performance Objective	Related Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Take the temperature of the cream 4. Test the acidity of the cream and if it is high, neutralize with soda bi-cab/ caustic neutralizers. 5. Take the cream into churn up to 1/3rd barrel capacity. 6. Adjust the fat content to 38-42% by adding chilled water. 7. Close the lid & run the butter churn. 8. Open the chilled water to sprinkle on the churn if such facility is provided. 9. Rotate the churn at high speed. 10. Observe the sight glass & if it is clean, stop the churn & open the lid. 11. Add break up water. 12. Close the lid & rotate again at medium speed. 13. Stop the churn 14. Test the moisture percentage of the butter. 15. Adjust the moisture content if necessary. 16. Take out the butter 17. Store the butter in deep freeze. 18. Clean the churn with hot water & detergent solution 19. Leave the churn open for drying.	**Condition(Given):** Butter churn and standard **Task (What):** Churn cream to produce plain butter **Standard (How well):** Plain butter produced as per the given standard. Butter churned from cream having permissible loss of fat in butter.	• Concept of plain butter • Acidity test of cream • Moisture test of butter • Quality & grading of butter • Storing condition for butter • Butter molding machine • Procedure

Tools/equipment: Butter churn .Butter scoop, moisture balance.
Safety: Keep the air vent open while churning.

Task Structure

TASK NO. 2 Produce table butter.

Steps	Terminal Performance Objective	Related Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Take chilled cream at 8-10 deg. Celsius in butter churn. 4. Adjust the fat content to 38-42% by adding chilled water. 5. Add butter colour. 6. Close the lid & run the butter churn. 7. Open the chilled water to sprinkle on the churn if such facility is provided. 8. Rotate the churn at high speed. 9. Observe the sight glass & if it is clean, stop the churn & open the lid. 10. Add break up water. 11. Close the lid & rotate again at medium speed. 12. Stop the churn 13. Add butter salt 14. Work out the butter. 15. Test the moisture percentage of the butter. 16. Adjust the moisture content if necessary. 17. Take out the butter & pack 18. Store the butter in deep freeze. 19. Clean the churn with hot water & detergent solution 20. Leave the churn open for drying.	**Condition(Given):** Butter churn. **Task (What):** Produce table butter **Standard (How well):** Table butter with smooth consistency and uniform salt produced.	• Butter colour • Butter salt • Food Act related to butter standard • Fat test of cream& butter • Moisture test of butter • Quality & grading of butter • Storing condition for butter • Butter molding machine. • Procedure

Tools/equipment: Butter churn with worker, Butter scoop, moisture balance.
Safety: Keep the air vent open while churning.

Task Structure

TASK NO: 3 Produce Ghee from butter.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Put the butter into the butter milting vat. 4. Transfer the milted butter into the settling tank. 5. Drain out the butter milk and transfer the milted butter into the ghee gattle. 6. Boil the ghee up to 110 deg Celsius. 7. Close the steam valve & leave on disturbed for some time. 8. Pass the ghee through filter and clarifier. 9. Store the ghee in storage tank. 10. Fill the ghee at 45 deg Celsius. 11. Store the fill pouches/ Counter at ambient temperature for 24 hrs for crystallization. 12. Transfer to cold store for further storage.	**Condition(Given):** Plain butter and ghee plant **Task (What):** Make ghee from butter using Steam jacketed Vassar. **Standards (How well):** Butter having granular texture & characteristics aroma produced with permissible loss of fat.	• Construction and operation of butter milting vat, ghee cattle, high pressure filter and clarifier • Characteristics flavour and texture of ghee • Judging and grading the ghee • Production loss • Procedure

Tools/equipment: Ghee plant having butter milting vat, settling tank, ghee cattle, high pressure filter, clarifier, packing machine.

Safety:

1. Take care of slippery surface of the ghee section.
2. Don't apply more steam pressure in ghee cattle.
3. Do not hold the ghee at final temperature for long time.

Task Structure

TASK NO: 4 Produce Yogurt/Dahi

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take milk of required fat % into the batch pasteurizer. 4. Heat the milk to 45 deg Celsius. 5. Mix sugar, skim milk powder & any other additives with milk. 6. Heat to city 5 deg Celsius. 7. Homogenize at appropriate pressure. 8. Heat to 85 deg Celsius & hold for 20 min. 9. Cool to 42 deg Celsius. 10. Add Yoghurt culture & mix well. 11. Fill in the cup or pouches. 12. Incubate at 42 deg Celsius for 3 to 4 hrs. 13. Transfer to cold store and store till dispatched for sale.	**Condition(Given):** Milk & other additives and batch pasteurizer. **Task (What):** Produced yoghurt/ dahi. **Standards (How well):** Firm set yogurt/dahi with good aroma & taste produced.	• Quality of milk suitable for yoghurt • Different varieties of yoghurt • Effect of heat on body and texture of yoghurt • Homogenizing yoghurt milk • Yoghurt culture • Procedure

Tools/equipment: Batch pasteurizer with heating & cooling facility, Homogenizer Incubator, cold store, filling unit.
Safety: Don't laps between culture addition and filling in the cup.

Task Structure

TASK NO. 5 Produce Lassi.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Take milk with 4% fat & 9% SNF. 4. Heat to 85 deg. Celsius & hold for 15 min. 5. Cool to 30 – 30 deg. Celsius. 6. Add dahi culture. 7. Incubate for 8 – 12 hrs. 8. Add water @ 13% of milk & sugar @ 8%. 9. Mix well & pass through homogenizer with out applying pressure. 10. Fill & seal in poly pack. 11. Store in cold store.	**Condition(Given):** Milk, equipped lab and standard. **Task (What):** Produce sweet lassi. **Standard (How well):** Sweet lassi produced with saffron and cardamom flavour as per the standard.	• Concept of lassi • Judging the quality of sugar • Selecting appropriate quality of colour & flavor • Fat & SNF Test • Dahi culture • Operation of homogenizer • Procedure

Tools/equipment: Batch Pasteurizer, Homogenizer, Packing machine.
Safety:

Task Structure

TASK NO. 6 Produce Sikarni.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Heat whole milk to 40 deg. Celsius. 4. Separate the cream. 5. Pasteurize, cool & store the cream. 6. Take the skim milk in an aluminum can. 7. Heat to 85 deg. Celsius & hold for 10 min. 8. Cool to 30-32 deg. Celsius & add dahi culture. 9. Put the curd mass into a muslin cloth & hang till dropping of free water stops. 10. Take the drained curd mass into a vessel & knead well. 11. Pass through muslin cloth. 12. Add flavoring & coloring ingredient & mix well. 13. Fill in 50 ml or 100 ml cup by weighting. 14. Store in cold store.	**Condition(Given):** Milk; equip lab, sugar & flavouring agent. **Task (What):** Prepare sikarni using skim milk & cream. **Standard (How well):** Smooth textured sikarni prepared.	• Concept of sikarni • Cream separation • Taste & flavour of good quality sikarni • Flavouring & colouring ingredients • Procedure

Tools/equipment: Aluminum can plunger, heating facility muslin cloth.

Safety:

1. Hang the curd in cool place.
2. Maintain personal hygiene.

Task Structure

TASK NO: 7 Produce paneer.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take fresh buffalo milk. 4. Heat to 85-90 deg Celsius. 5. Prepare coagulant (Citric acid solution). 6. Add coagulant to milk at 80-85 deg Celsius while stirring. 7. Leave on disturb for 10 min. 8. Filter through muslin cloth. 9. Put the coagulant into the hoop. 10. Apply pressure and leave it for some time (nearly 30 to 60 min) . 11. Remove pressure and put the cape into the cold water. 12. Cut the paneer into required size & pack. 13. Use vacuum packing machine for packing. 14. Store in cold room. .	**Condition(Given):** Fresh buffalo milk, necessary tools and equipment **Task (What):** Produce paneer. **Standards (How well):** Paneer of good body & texture prepared with desired yield.	• Coagulant preparation • Quality of paneer • Yield of paneer • Different type of press. • Vacuum packing machine • Factor effecting coagulation of milk • Procedure

Tools/equipment: Milk heating vessel, plunger, press, hoops, vacuum packing machine.
Safety:
1. Filter the coagulum carefully.
2. Read instruction carefully before operating vacuum packing machine.

Task Structure

TASK NO: 8 Produce Chhana

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take fresh cow milk. 4. Heat to 90 deg Celsius or boil. 5. Cool to 70 deg Celsius. 6. Prepare Coagulant. 7. Add Coagulant while stirring. 8. Leave undisturbed for 10 min. 9. Filter coagulum through muslin cloth. 10. Deep the coagulum with cloth in following tape water to cool down. 11. Hang the Chhana mass till dropping of free water stops. 12. Use fresh Chhana for sweet preparation.	**Condition(Given):** Cow milk and citric acid as a coagulant. **Task (What):** Prepare Chhana from cow milk for sweet preparation. **Standards (How well):** Soft and smooth Chhana produced.	• Differentiating cow & buffalo milk • Quality of Chhana suitable for sweet preparation • Coagulant preparation • Yield of Chhana • Production loss of Chhana • Procedure

Tools/equipment: Milk heating vessel, plunger, and muslin cloth.
Safety: Filter the coagulum carefully.

Task Structure

TASK NO: 9 Prepare Khoa		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take fresh buffalo milk. 4. Test for neutralization addition. 5. Take the milk in iron karahi. 6. Apply fire while agitating the milk continuously. 7. Slow down heat when pat formation starts,. 8. Add a small quantity of citric acid solution to granular khoa is required. 9. Take out for the fire. 10. Allow to cool down. 11. Store in cool.	**Condition(Given):** Buffalo milk, adulteration testing kit, Karahi, ladle & oven. **Task (What):** Prepare khoa in iron karahi using buffalo milk. **Standards (How well):** Soft, white & granular khoa produced from buffalo milk.	• Concept of desiccated sweets • Types of desiccated sweets • Introduction of khoa • Judging the quality of milk. • Different varieties of khoa used for sweet preparation • Grading of khoa • Storage of khoa • Procedure

Tools/equipment: Iron karahi, laddle, oven with control.
Safety: Observe personal safety.

Task Structure

TASK NO. 10 Produce Ice – cream

Steps	Terminal Performance Objective	Related Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Take milk in a batch pasteurizer & heat to 45 deg. Celsius. 4. Add calculated quality of cream, SMP & stabilizer/ emulsifier & mix well. 5. Raise the temperature to 65 deg. Celsius. 6. Homogenize using double stage homogenizer. 7. Heat to 85 deg. Celsius & hold. 8. Cool to ambient temperature using tape water. 9. Transfer to ageing vat, cool to 2 – 4 deg. Celsius & hold over night. 10. Add required quality of flavour & colour. 11. Fill the freezer barrel up to 50% of the capacity with mix. 12. Run the freezer, adjust the air pressure. 13. Fill the frozen Ice cream in the cup & store in deep freezer.	**Condition(Given):** Milk & necessary ingredients. **Task (What):** Prepare mix for ice-cream. Produce Ice cream by freezing the mix. **Standard (How well):** Smooth textured ice cream with 80 – 90 % over run produced.	• Composition of various varieties of ice cream • Types of Ice cream • Calculating the quality of different ingredient of Ice cream mix • Stabilizer & Emulsifier. • Colour & flavour • Ice cream freezers, its construction & operation. • Economy of Ice-cream production • Measuring over run. • Fat testing of IC • Operation of homogenizer. • Homogenizing pressure & temperature • Hardening tunnel • Procedure

Tools/equipment: Batch Pasteurizer, Aging vat, Ice cream freezer, deep freeze, homogenizer.
Safety: Personal Safety at each step.

Task Structure

TASK NO. 11 Produce sterilized milk.

Performance Steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Select the milk with 70% alcohol negative. 4. Heat, separate & standardized to 3% fat & 9.0% SNF. 5. Heat to 75 deg. Celsius & homogenize with double stage homogenizer. 6. Add refined white sugar. 7. Cool to 5 deg. Celsius. 8. Fill in the bottle. 9. Apply crown pack. 10. Auto calves at 120 deg. Celsius for 20 min. 11. Release the pressure & take out the bottle from the stabilizer. 12. Store at atmospheric temperature.	**Condition(Given):** Flour, milk and batch sterilizer. **Task (What):** Prepare sterilize milk in glass bottle. **Standard (How well):** Sterilize flavour milk produced with out any spoilage of milk or bottle with minimum 30 days shelf life.	• Definition of sterilized milk • Alcohol test • Creaming index • Crown capping • Quality of glass bottle Suitable of sterilization • Cream separation • Standardization • Operation of homogenizer • Procedure

Tools/equipment: Aluminum can plunger, heating facility Separator, homogenizer, Auto clave, Glass bottle, Crown capping machine.

Safety:

1. Don't apply more steam pressure than required.
2. Don't open the lead when sterilizer is hot. & under pressure.

Module: 1

Sub-module: 3: Laboratory Tests

Description:

This sub module consists of knowledge and skills related to laboratory tests. It consists of tasks related to laboratory tests of milk and milk products. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance of the task.

Objective:
After its completion of this module the trainees will be able:

- To determine PH of milk & yoghurt.
- To determine acidity of the milk /dahi/yoghurt
- To determine fat content in yoghurt.
- To determine fat content in Ice-cream.
- To determine total solid of ice-cream.
- To determine titratable acidity of ghee & butter.
- To determine moisture content of butter &ghee.
- To determine fat % in butter
- To determine over-run of Ice cream.
- To prepare Yoghurt culture.
- To sanitize glassware & laboratory equipments.

Tasks:

1. Determine PH of milk & yoghurt.
2. Determine acidity of the milk /dahi/yoghurt
3. Determine fat content in yoghurt.
4. Determine fat content in Ice-cream.
5. Determine total solid of ice-cream.
6. Determine titratable acidity of ghee & butter.
7. Determine moisture content of butter &ghee.
8. Determine fat % in butter
9. Determine over-run of Ice cream.
10. Prepare Yoghurt culture.
11. Sanitize glassware & laboratory equipments.

Task Structure

TASK NO: 1 Determine PH of milk & yoghurt.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Read the manufacturers instruction for operation of the P^H meter. 4. Take 10 gm well mixed sample of milk & yoghurt separately & mix with 10 ml of water. 5. Standardize the instrument against known buffer solution. 6. Check against another buffer solution of different P^H. 7. Calomel and milk half cells to the potential meter. 8. Read the result directly from the instrument.	**Condition(Given):** Milk & yoghurt and and P^H meter **Task (What):** Determine P^H of milk & yoghurt. **Standards (How well):** P^H of milk & yoghurt determined accurately.	• Concept of PH test • P^H of milk & milk products • Importance & usefulness of P^H • Working of P^H meter • P^H range • Buffer solution • Procedure of testing

Tools/equipment: P^H meter equipped with measuring & reference electrode, analytical balance, spoon & spatula.
Safety: Read the instruction carefully before using P^H meter.

Task Structure

TASK NO: 2 Determine acidity of the milk /dahi/yoghurt.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Prepare reagents & apparatus. 4. Thoroughly mix the milk & dahi. 5. Measure 10 ml of content into the porcelain basin. 6. Add equal volume of freshly boiled & cooled water. 7. Add 1 ml of phenolphthalein indicator. 8. Titrate against standard solution of NaoH while stirning with glass rod. 9. Observe the change in colour i.e. punk tint. 10. Complete the titration within 20 seconds.	**Condition(Given):** Milk, yoghurt well equipped lab **Task (What):** Determine acidity of the milk /Dahi **Standards (How well):** % age acidity of milk & yoghurt determined. Quality of milk & yoghurt assessed.	• Concept of acidity test • Reagent preparation • Calculating % acidity • Interpreting result in relation to quality of milk & dahi • Procedure of testing

Tools/equipment: Burette with Boca lime guard tubes, measuring cylinder, 10ml pipette, white porcelain basin, stirring glass rod.
Safety: Avoid incorporation of air while mixing.

Task Structure

TASK NO: 3 Determine fat content in yoghurt.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 10 ml of Gerber sulpheric acid into the butyrometer. 4. Pour 10 ml of well mixed sample carefully. 5. Put 2 ml of amyl alcohol into the butyrometer. 6. Shake well & centrifuge. 7. Put the butyrometer in water bath maintained at 65 deg Celsius for 5 min. 8. Take the reading. 9. Multiply this reading with 1.05 to get actual fat content of the dahi.	**Condition(Given):** Yoghurt and Gerber equipment and butyrometer **Task (What):** Determine fat content in yoghurt. **Standards (How well):** Fat percentage in yoghurt determined	• Concept of fat content test • Composition of yoghurt • Operation of centrifuge machine • Pre ph of Gerber sulpheric acid • Quality of acid & alcohol used for the testing • Standardization of glass ware • Procedure of testing

Tools/equipment: Gerber centrifuge, Gerber butyrometer, hot water halt, acid & alcohol tilt measure 10 ml pipette, lock stopper, lock stopper key, shaking stand.

Safety:

1. Handle acid carefully.
2. Close the cork carefully using lock stopper key.
3. Use shaking stand for shaking the butyrometer.
4. Pour the milk slowly in the butyrometer through the side of the neck.

Task Structure

TASK NO: 4 Determine fat content in Ice-cream.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Weigh a carefully 5 gm of milted sample into the ice cream butyrometer. 4. Add 6 ml of hot water for dilution and wash. 5. Take 10 ml of sulpheric acid into the butyrometer & add 1 ml of amyl alcohol. 6. Insert the stopper. 7. Shake, invert 5 times and centrifuge 5 min at 1100 RPM.	**Condition(Given):** Ice cream , sulpheric acid and Gerber equipment **Task (What):** Determine fat content in Ice-cream. **Standards (How well):** Fat content in ice cream determined.	• Composition of ice cream. • Sulpheric acid preparation for ice cream testing. (Specific gravity 1.807) • Procedure of testing

Tools/equipment: Ice cream butyrometer (0-12% range), 1 ml & 5 ml pipette, electronic weighing balance.

Safety:

1. Handle acid carefully.
2. Close the cork carefully using lock stopper key.
3. Use shaking stand for shaking the butyrometer.
4. Pour the milk slowly in the butyrometer through the side of the neck.

Task Structure

TASK NO: 5 Determine total solid of ice-cream.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Weigh a clean, dry and empty porcelain dish (w). 4. Weigh 2 to 4 gm of mix sample of ice cream into the dish (w1). 5. Place the dish uncovered on boiling water bath at least for 30 minutes until it appears dry. 6. Remove the dish from the water bath, wipe the bottom and keep the dish in the hot air oven over a silica triangle and heat at 98-100 deg Celsius for about 3 hrs. 7. Transfer the dish to a decicator, after three hrs; allow it to cool for about 30 min. 8. Weigh the dish (W2). 9. Return the dish to the oven and heat for 1 hrs. 10. Remove it to the desicator, cool and weigh as before. Repeat if necessary until the loss of weigh between successive weighing does not exceed 0.5 mg. (w2).	**Condition(Given):** Ice- cream and by gravimetric equipment **Task (What):** Determine total solid of ice-cream. **Standards (How well):** TS % calculated using formula as (W2-W)/(W1-W)*100 -	• Concept of total solid test • Composition of ice-cream • Operation of hot air oven and electronic balance • Procedure of testing

Tools/equipment: Porcelain dish, hot air oven, and balance (sensitivity 0.1 mg).
Safety:

Task Structure

TASK NO: 6 Determine titratable acidity of ghee & butter.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Weigh accurately about 20 gram of the butter sample in a dry 250-ml conical flask. 4. Add 90 ml of hot, previously boiled water and shake the contents. 5. Titrate with 0.02N sodium hydroxide while still hot, using one milliliter of the phenolphthalein indicator.	**Condition(Given):** Titratable acidity , butter or ghee and titration equipment **Task (What):** Determine titratable acidity of ghee & butter. **Standards (How well):** Percentage Titratable acidity(as lactic acid) Calculated using formula (9*N*V)/W.	• Concept of titratable acidity test • Normal acidity of ghee and butter • Importance of titratable acidity • Preparation of sodium hydroxide solution for titration. • Procedure of testing

Tools/equipment:. Burette with soda- lime guard tube, conical flask(250 ml capacity).
Safety:

Task Structure

TASK NO: 7 Determine moisture content of butter & ghee.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Clean the aluminum dish and dry in an oven. 4. Allow to cool to the room temperature in desiccators and weigh the dish. 5. Accurately weigh into the dish 10 gm of the sample in the aluminum dish, using the appropriate balance. (w1). 6. Place the dish over the hot plate and heat the dish agitating continuously by swirling the beaker using tongs if necessary or by stirring the contents with a glass rod. Control the heating and agitating so that losses by spattering and frothing are avoided. 7. Continue the heating of the sample, until the frothing stops & foaming broken. The colour of the non fat solids changes from creamy white to yellow brown. 8. *Note: A whitish, yellow colour indicates insufficient heating which results in low values. On the other hand a dark brown colour or black curd indicates over heating which results in high values.* 9. Allow the dish to cool in desiccators when cooled; place the dish on the balance. Record the weight. Weight w2.	**Condition(Given):** Butter & ghee, desiccators and other equipment **Task (What):** Determine moisture content of butter &ghee. **Standards (How well):** Moisture percentage by weight determined using formula 100*(W1-W2)/(W1-W)	• Concept of moisture content test • Composition of butter and ghee • Legal requirement of butter and ghee • Procedure of testing

Tools/equipment: Flat bottomed aluminum dish, tongs, balance, electric hot plate, desiccators, gas burner.

Safety:

Task Structure

TASK NO: 8 Determine fat % in butter.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Weigh 5 gram well mixed butter sample into the stopper funnel and fix the funnel to the butter butyrometer. 4. Add 10 ml. sulphuric acids through the upper opening of the butyrometer. 5. Add 1 ml. amyl alcohol to the butyrometer and adjust the level up to the top graduated scale mark adding distilled water. 6. Close the butyrometer with a rubber stopper and mix the content thoroughly by inverting the butyrometer at least 10 times. 7. Centrifuge for 5 minutes and place the butyrometer in the water bath at 65 deg. Celsius.	**Condition(Given):** Butter, butyrometer and Gerber equipment **Task (What):** Determine fat % in butter **Standards (How well):** Fat content of the butter observed clearly in the column of butter butyometer.	• Concept of fat % age test in butter • Preparation of sulphuric acid suitable for butter fat testing • Composition of butter • Principle of fat testing • Procedure of testing

Tools/equipment: Butter butyrometer (70-90% range) with stopper funnel, balance, Gerber centrifuge (1100 rpm), water bath (65 deg. Celsius).

Safety:

1. Handle acid carefully.
2. Close the cork carefully using lock stopper key.
3. Use shaking stand for shaking the butyrometer.
4. Pour the milk slowly in the butyrometer through the side of the neck.

Task Structure

TASK NO: 9 Determine over-run of Ice cream.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take the accurate weight of the ice cream cup. Weight W. 4. Fill up the cup with ice cream mix and weigh again. Weight W1. 5. Empty the cup and fill the same with ice cream after freezing and weigh again. Weight W2.	**Condition(Given):** Ice-cream, necessary tools and equipment **Task (What):** Determine over-run of Ice cream **Standards (How well):** Percentage over-run determined using formula as (W1-W2)/(W2-W)*100.	• Concept of over-run test • Factor affecting over-run • Legal requirement of over-run in ice-cream • Procedure of testing

Tools/equipment: Weighing balance (at least two decimals) and an ice cram cup of specific known volume.
Safety:

Task Structure

TASK NO: 10 Prepare yoghurt culture.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Dissolve non fat dry milk to get 10% T.S. liquid milk. 4. Heat in boiling water for 1 hr. 5. Cool to 42 deg Celsius. 6. Take out freeze dried culture for the freeze & allow coming to ambient temperature. 7. Inoculate the whole content into 500 ml milk treated as above. 8. Incubate 42 deg Celsius. 9. Transfer this culture (mother culture) to more quantity of milk @ 2 % & proceed as above. 10. Re-propagate the culture in bulk quantities above for use in yoghurt per ph. 11. Cool & store at 4 deg Celsius immediately deter incubation till further use.	**Condition(Given):** Freeze dried commercial culture in used to prepare mother, intermediate & bulk culture for yoghurt preparation. **Task (What):** Prepare milk for yoghurt culture propagation. Propagate culture & evaluate the quality. **Standards (How well):** Freeze dried yoghurt culture propagated successfully. Yoghurt culture with characteristics aroma & acid production obtained.	• Concept of yoghurt culture • Lactic acid bacteria • Different types of commercial culture. • Bacterio phase • Falvour production. • Judging viability of the culture • Mother culture, intermediate culture & bulk culture • Acidity test • Bacterial growth curve. • Procedure of culture preparation

Tools/equipment: Hot water bath, conical flask, culture vessels, Incubator, Freeze.
Safety:
1. Avoid contamination.
2. Maintain personal hygiene.

Task Structure

TASK NO: 11 Sanitize glassware & laboratory equipments.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Clean all laboratory equipment & glass wares manually using liquid soap. 4. Plug all glass wares e.g. uncial flask, test tube, pipette with cotton. 5. Wrap the plugged portion with paper. 6. Put the glass wares into the hot air oven. 7. Put on the oven & maintain at required temperature for a period of time. 8. In case of SS & other metal equipment, boil in hot water for 10 min.	**Condition(Given):** All the laboratory equipment & glass wares have to be sterilized / sanitized. **Task (What):** Clean & sanitize laboratory equipments. Clean & sanitize glass wares. **Standards (How well):** All the laboratory equipment & glass ware / sterilized.	• Construction of autoclave & its operation • Time temperature combination for sterilizing glass wares • Procedure

Tools/equipment: Autoclave, Hot air oven, pipette holder.
Safety: handle the glass ware carefully.

Module: 2: Sweets Maker

Description

This module consists of the knowledge and skills related to sweets making. This module provides skills and knowledge related to the preparation of Khoa based milk sweets, Chhana based milk sweets, cultured/fermented products, and milk based puddings / desserts.

Objective
After completion of this module the trainees will be able:

- To prepare Khoa based milk sweets
- To prepare Chhana based milk sweets
- To prepare cultured/fermented products
- To prepare milk based puddings / desserts

Sub-modules:

1. Khoa based milk sweets
2. Chhana based milk
3. Cultured/Fermented Milk Products sweets
4. Milk Based Puddings / Desserts

Module Structure

S.N.	Sub-modules	Nature	Total hours	Full marks
1	Khoa based milk sweets	T+P	190	150
2	Chhana based milk sweets	T+P		
3	Cultured/Fermented Milk Products	T+P		
4	Milk Based Puddings / Desserts	T+P		
	Total		**190**	**150**

Module: 2

Sub module: 1: Khoa Based Milk Sweets

Description:

This sub module consists of knowledge and skills related to khoa based milk sweets making technology. It consists of tasks related to khoa based milk sweets making. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the task.

Objective:
After its completion of this module the trainees will be able:

- To develop the concept of sweet
- To prepare gulab jamun
- To prepare kala-jamun
- To prepare pantuwa/ledikeni
- To prepare lalmohan
- To prepare burfi
- To prepare kalakand
- To prepare milk cake
- To prepare peda
- To prepare Rabri
- To prepare kulfi

Tasks:

1 Develop the concept of sweet
2 Prepare gulab jamun
3 Prepare kala-jamun
4 Prepare pantuwa/ledikeni
5 Prepare lalmohan
6 Prepare burfi
7 Prepare kalakand
8 Prepare milk cake
9 Prepare peda
10 Prepare Rabri
11 Prepare kulfi

Task Structure

TASK NO: 1 Develop the concept of sweets.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Define sweet 2. Enlist importance of sweet 3. Enlist general types of sweet 4. Enlist milk based sweets	**Condition(Given):** Sweets cook book **Task (What):** Develop the concept of sweets **Standards (How well):** Concept of sweet developed.	• Concept of sweets • Importance of sweet • General type of sweet • Type of milk based sweet

Task Structure

TASK NO: 2 **Prepare Gulab-jamun.**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 300 gm of Dhop type (less dry) khoa with 40 to 50% moisture. 4. Add 3 gm of baking powder. 5. Knead well & roll into a rounder cylindrical shape of 15-20 gm pieces. 6. Deep fry inedible oil or ghee in a shallow pan until they acquire a golden colour. 7. Put the fried halls into sugar syrup of 62.5% count ration. 8. Allow to soap for few hrs.	**Condition(Given):** Khoa, frying oil, sugar, baking powder, Shallow pan, wooden plank **Task (What):** Prepare sugar syrup. Prepare the dough. Fry the balls. **Standards(How well):** Golden colored sweet prepared with characteristics texture & body.	• Quality of khoa • Quality of taking powder • Preparation of sugar syrup • Characteristics of gulab jamun • Procedure

Tools/equipment: Shallow pan, wooden plank.

Safety:

1. Protect yourself from hot oil.
2. Put the ball into the hot oil carefully.

Task Structure

TASK NO: 3 **Prepare Kalajamun.**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Mix khoa & Chhana with wheat flour @ 5-6%. 4. Add baking powder @ 0.5%. 5. Knead into smooth dough. 6. Divide into balls. 7. Deep fry in ghee till the surface is almost black in colour. 8. Remove the balls from the oil & soak in 60% sugar syrup for few hrs. 9. Remove from the syrup & store till consumption.	**Condition(Given):** Khoa, frying oil, sugar, baking powder, wheat flour, Shallow pan, wooden plank **Task (What):** Prepare sugar syrup. Prepare the dough. Fry the balls. **Standards (How well):** Dark colored sweet prepared with characteristics texture & body.	• Quality of khoa • Quality of taking powder • Preparation of sugar syrup • Characteristics of kala jamun • Procedure

Tools/equipment: Shallow pan, wooden plank.

Safety:

1. Protect you from hot oil.
2. Put the ball into the hot oil carefully.

Task Structure

TASK NO: 4 **Prepare Pantuwa/Ledikeni**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Mix the following ingredients in given proportion. cow milk Chhana – 50% Khoa (Dhap type)-40% Mavida – 3% Arrorot – 3% Suji – 3% Grand Sugar – 0.7% Backing powder –0.3% 4. Knead to form dough with approx 40% moisture. 5. Make spherical balls. 6. Fry in hydro-generated oil (120 deg Celsius). 7. Remove for the oil & dip in 55% sugar syrup at 60 deg Celsius for 4 hours.	**Condition(Given):** Chhana, khoa,maida, suji, sugar baking powder,frying oil, karahi & oven **Task (What):** Prepare Pantuwa/Ledikeni **Standards (How well):** A product similar to Gulabjamun called pantuwa/ Ledikeni prepared using khoa, Chhana & other ingredeants.	• Chhana • Khoa • Syrup Preparation • Characteristics of pantuwa. • Procedure

Tools/equipment: Shallow pan, wooden plank.

Safety:

1. Protect you from hot oil.
2. Put the ball into the hot oil carefully.

Task Structure

TASK NO: 5 **Prepare Lalmohan**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take Chhana & mix with 2-3 % of wheat flour. 4 Knead into a uniform dough.. 5 Roll into small balls. 6 Deep fry in ghee until light brown colour. 7 Transfer fried balls to 60% sugar syrup. 8 Allow to soak for few hrs.	**Condition(Given):** Chhana, frying oil, karahi,wheat flour & oven. **Task (What):** Prepare sugar syrup. Prepare the dough. Fry the balls. **Standards (How well):** Red colored sweet prepared with characteristics texture & body.	• Quality of khoa/chhana • Quality of taking powder • Preparation of sugar syrup • Characteristics of lalmohan • Procedure

Tools/equipment: Shallow pan, wooden plank.

Safety:

1. Protect you from hot oil.
2. Put the ball into the hot oil carefully.

Task Structure

TASK NO: 6 Prepare Burfi.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take khoa & knead with hand as smooth texture as possible. 4 Mix sugar (crystallice) @ 30% of khoa. 5 Heat on direct fire to heated the khoa & sugar well. 6 Handle the content of the pan carefully to produce desirable attributes of flavor, body & texture. 7 Add flavouring ingredients judicially in pan at suitable stage mostly forwards the end of cooking process. 8 Pour the product into a tray having the desire thikness. 9 Allow to set at ambient temp. 10 Cut the burfi into required shape & size. 11 Pack in a paper or corrugated carob ox.	**Condition(Given):** Khoa,sugar,flavouring ingredients, Iron Karahi, tray, knife **Task (What):** Prepare Burfi **Standards (How well):** Burfi with characteristics flavour, loudy & texture prepared.	• Quality of khoa suitable • Additives added in burfi • Characteristics of burfi • Packaging of sweet • Keeping quality • Procedure

Tools/equipment: Iron Karahi, tray, knife.
Safety:

Task Structure

TASK NO: 7 Prepare Kalakand.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take buffalo milk with 6% fat & 9% SNF in Iron karahi. 4 Place the karahi on brisk & non smoky fire with continious stirring with ladle with circular motion. 5 Reduce the intensity of heat. when semi solid stake in reached, 6 Add sugar @ 6-7% by the wt. Of milk & stir well. 7 Add chopped nuts & flavouring ingredients & stir for minutes more. 8 Transfer the fired product into a tray greased with ghee for cutting & setting. 9 Cut the set product into pieces & pack.	**Condition(Given):** Iron Karahi, tray , knife & ladder , buffalo milk, sugar & flavoring ingredients. **Task (What):** Prepare Kalakand **Standards (How well):** Kalakand with characteristics flavour, loudy & texture prepared. .	• Testing the quality of milk • Characteristics of kalakand • Procedure

Tools/equipment: Iron Karahi, tray, knife & ladder.
Safety:

Task Structure

TASK NO: 8 Prepare Milk Cake		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take the milk with 6% fat & 9% SNF. 4 Boil in karahi for 3 minutes & add citric acid @ 0.02% (W/volume of milk). 5 Continue boiling till volume is reduced to 50%. 6 Add sugar @6% (w/v). 7 Continue desiccation with fast stirring to get dough like consistency. 8 Transfer the content into a greased tray. 9 Allow to cool slowly in insulated box for 5-6 hrs. Or put the bottom of the tray in ice water to have colour differentiation. Lower layer becomes whiter. 10 Cut in desired shape & size when the product is cooled. 11 Pack in parchment paper. 12 Store at 5 deg. Celsius till consumption.	**Condition(Given):** Karahi lakle, tray ,milk, citric acid, sugar & parchment paper **Task (What):** Prepare milk cake. **Standards (How well):** Milk cake without colour differentiated prepared Milk cake with colour differ product prepared.	• Quality of Raw milk • Process of caramalization • Characteristics of milk cake • Consumer preference • Procedure

Tools/equipment: Karahi lakle, tray.
Safety:

Task Structure

TASK NO: 9 Prepare Peda		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Mix khoa & sugar in the ration of 3:1. 4 Heat the khoa-sugar mixture on a gentle fire till the mixture turns relatively firm. 5 Remove the pan for the fire. 6 Mix nuts & flavouring substances if needed. 7 Mix the content thoroughly make into balls of 15-20 gm size by rolling between the palms after applying little ghee to avoid sticking. 8 Flatten the balls to give the disk shape or use different shapes dies molds for giving the shape. 9 Pack in card board.	**Condition(Given):** Karahi, tray, ladle.,khoa, sugar, nuts & flavoring ingredients. **Task (What):** Prepare peda using khoa & sugar. Give shape using dies/molds. **Standards (How well):** Peda having whitish colour & grainy texture prepared from khoa & sugar.	• Different type of common ingredient used for flavouring or colouring peda • Characteristics of peda. • Keeping quality • Quality of khoa used for peda • Factor affecting quality of peda • Composition of peda • Procedure

Tools/equipment: Karahi, tray, ladle.
Safety:

Task Structure

TASK NO: 10 **Prepare Rabri.**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take 3-4 litre of buffalo milk in a Karachi. 4 Heat at shim moving temperature (85-90 deg Celsius). 5 Fan the surface to facilitate the skin formation. 6 Break skin (3-4 can pieces) with wooden stick and remove to cuter part of the vessel. 7 Reduce volume to 1/5th 8 Add sugar @ 5-6% of original milk. 9 Immerse the layers of the skin into the concentrated milk. 10 Heat for a white. 11 Add desired flavour & nuts. 12 Serve chilled.	**Condition(Given):** Karahi, Wooden stick, buffalo milk, sugar & flavour & nuts. **Task (What):** Prepare Rabri. **Standards (How well):** White to brownish colour with pleasant caramelized flavoured product produced.	• Characteristics of rabri. • Colour & flavouring substances used in rabri production • Procedure

Tools/equipment: Karahi, Wooden stick.
Safety:

Task Structure

TASK NO: 11 **Prepare Kulfi.**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take cow /buffalo mix milk in a pan oven fire. 4 Concentrate the milk & add sugar & mix well. 5 Add small quality of khoa/skim milk powder while boiling the milk. 6 Add nuts & saffron. 7 Fill in the mixture aluminum cones/plastic cones & put the lid or seal with wheat flour. 8 Seal the cones in salt- ice mixture in an earthen pot. 9 Agitate vigorously from time to time effect heat transfer.	**Condition(Given):** Pan, ladle, cones, Earthen pot, milk,sugar,khoa,ice, salt, cones. **Task (What):** Prepare Kulfi **Standards (How well):** Kulfi of delicious quality produced having characteristics flavour.	• Formulation of kulfi • Freezing through the use of Ice & salt • Procedure

Tools/equipment: Pan , ladle, cones, Earthen pot.
Safety:

Module: 2

Sub-module: 2: Chhana Based Milk Sweets

Description:

This sub module consists of knowledge and skills related to chhana based milk sweets processing technology. It consists of tasks related to chhana based milk sweets making. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance of the task.

Objective:
After its completion of this module the trainees will be able:

- To prepare Rasogolla
- To prepare Rasomalai
- To prepare Rajbhog
- To prepare Kheer mohan
- To prepare Sandesh
- To prepare Chhana murki
- To prepare Cham-cham
- To prepare Sitabhog
- To prepare Chhana gaja
- To prepare Chhana kheer
- To prepare Chhana pakora

Tasks:

1 Prepare Rasogolla
2 Prepare Rasomalai
3 Prepare Rajbhog
4 Prepare Kheer mohan
5 Prepare Sandesh
6 Prepare Chhana murki
7 Prepare Cham-cham
8 Prepare Sitabhog
9 Prepare Chhana gaja
10 Prepare Chhana kheer
11 Prepare Chhana pakora

Task Structure

TASK NO: 1 **Prepare Rasogolla (Rasabari).**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take freshly prepared cow milk Chhana and add with wheat flour & sodium hycarbonate (optional). 4 Mix & knead to smooth paste. 5 Divide the paste into 8-10 gm pieces. 6 Roll between palms to firm halls. 7 Prepare sugar syrup for cooking, 3 parts of sugar size mixed with 1 part of whey & 2 parts of water. 8 Adjust the pH of sugar syrup to 6.8 with calcium hydroxide. 9 Dip the balls in cooking medium. 10 Regulate the heat to import a suitable form to balls. 11 Cook for 20 min. 12 Add a small amount of water & whey solution continuously to maintain the contraction of the syrup. 13 Adjust the ratio of water & whey so as to maintain the pH of solution to 6.8. 14 Transfer the balls to container with water at 30-35 deg Celsius for texture stabilization & colour improvement. 15 Transfer the balls to sugar after 5-10 minutes of texture stabilization syrup with 50-60 Brix for 1-2 hours. 16 Transfer the balls to 40-50 Brix sugar syrup. 17 Cool the rasugolla to 10 deg Celsius.	**<u>Condition(Given):</u>** Milk heating vessel, plunger, karahi, ladder.,chhana,wheat flour,sugar. **<u>Task (What):</u>** Prepare the Chhana balls. Cook the balls & stabilize & store. **<u>Standards (How well):</u>** Snow white Rasogolla produced with spongy, chewy body & smooth texture.	• Introduction of rasogolla • Difference between cow milk & buffalo chhana • Yield of rasogolla • Preparation of sugar syrup for cooking & storage • Hydropower • Characteristics of Rasogolla • Procedure

Tools/equipment: Milk heating vessel, plunger, karahi, ladder.
Safety:

Task Structure

TASK NO: 2 **Prepare Rasomalai**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take Chhana & knead with 1-4% wheat flour to smooth dough. 4 Portion the dough & roll into balls having smooth texture without cracks. 5 Cook like rosugulla & stabilizer like Rasogolla. 6 Prepare the concentrated milk by evaporating the milk upon ¼ of its volume. Add 5.0% of sugar while boiling. 7 Use light Rabri to store the balls. 8 Transfer the balls to concentrated sweet milk. 9 Store chilled.	**Condition(Given):** Milk heating vessel, plunger, karahi, ladder, Chhana, wheat flour,sugar. **Task (What):** Prepare Rasomalai **Standards (How well):** Flattened Chhana patties floating in thickened milk produced.	• Introduction of rasomalai • Characteristics of rosmalai • Market potential • Economy of production • Preparation of rasogolla • Procedure

Tools/equipment: Milk heating vessel, plunger, karahi, ladder.
Safety:

Task Analysis

TASK NO: 3 Prepare Rajbhog.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Knead Chhana into uniform in dough mixed with small amount of saffron. 4 Portion & shape into balls with hands. The size of the balls in almost double than Rasogolla. 5 Place a raisin or mutt at the cuter of the ball. While shaping 6 Cook the balls in 50% sugar solution. 7 Continue cooking till desirable body & texture in achieve. 8 Remove the ball from the syrup & wrap in silver foil.	**Condition(Given):** Pan, wooden plank, ladle, Chhana, saffron, sugar, silver foil. **Task (What):** Prepare Chhana balls Cook the balls in the syrup. **Standards (How well):** A sweet similar to Rasogolla but larger in size & ballooned produced.	• Introduction of rajbhog • Preparation of sugar syrup • Cooling & flavouring of the sweet • Characteristics of the rajbhog • Procedure

Tools/equipment: Pan, wooden plank, ladle
Safety:

Task Structure

TASK NO: 4 **Prepare Kheer mohan.**		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Knead Chhana with 1-4% wheat flour to smooth paste. 4 Portion the dough & roll into balls smooth texture without cracks. 5 Flatten the balls into round shape. 6 Process similar to Rasogolla. 7 Remove the cooked balls & dip into concentrated milk. 8 Remove from the concentrated milk & sprinkle with grated khoa.	**Condition(Given):** Milk heating vessel, plunger, karahi, ladder, Chhana, wheat flour,sugar, khoa. **Task (What):** Prepare thick have ball. Cook in syrup. **Standards (How well):** A sweet similar to Rasogolla dipped in thickened milk prepared.	• Introduction of kheer mohan • Rasogolla preparation. • Concentrating the milk. • Decorating the sweets • Procedure

Tools/equipment: Milk heating vessel, plunger, karahi, ladder
Safety:

Task Structure

TASK NO: 5 Prepare Sandesh.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Take cow milk Chhana. 4 Knead to smooth paste & divide into two parts. 5 Take one hot of kneaded Chhana & add sugar @ 60% (w/w) of Chhana. 6 Cook to 75 deg Celsius for 15 minutes with continious stirring & scrapping till initial pat formation occurs. 7 Add remaining Chhana. 8 Resume heating to increase the temperature to 60 deg Celsius in 5 minutes for development of cooked flavour (colouring & flavouring substance may be added here). 9 Cool to 37 deg Celsius in 10 min. 10 Mould in desired shape & size. 11 Store at 7 deg Celsius.	**Condition(Given):** Milk heating vessel, plunger, karahi, ladder, Chhana, sugar. **Task (What):** Prepare Sandesh **Standards (How well):** Soft type of sandesh produced having firm body & smooth texture.	• Introduction of sandesh • Characteristics of sundesh • Different varieties of sandesh • Caramalization • Economy of production • Procedure

Tools/equipment: Pan, ladle.
Safety:

Task Structure

TASK NO: 6 Prepare Chhana - murki		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Knead the Chhana and make into 10 mm thick flat slab. 4 Cut into small cubes of about 10 mm. 5 Cook the cubes in boiling sugar syrup (of three string consistency) in karahi for 5 minutes with gentle stirring. 6 Remove the karahi for the fire and continue stirring till the sugar in coated uniformly around the cubes. 7 Remove the cubes from syrup. 8 Sprinkle the cubes with flavours & colours after cooling and decorate with dry nut flakes.	**Condition(Given):** Karahi, ladle, knife.,Chhana, sugar & flavouring & colouring ingredients. **Task (What):** Prepare Chhana - murki **Standards (How well):** The cubes of Chhana made & cooked in syrup. Flavour & colour. Decorated.	• Introduction of chhana murki • Chhana production. • Characteristics of the sweet. • Market potential & economy of production. • Decoration of the sweets • Procedure

Tools/equipment: Karahi, ladle, knife.
Safety:

Task Structure

TASK NO: 7 Prepare Cham-cham.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Knead the Chhana into uniform dough & portion & shape with hand into balls. 4 Boil the balls in 50% sugar syrup until desirable body & texture in achieve. 5 Remove for the syrup & cut into half. 6 Put a layer of khoa as sandwich between two halves. 7 Coat the surface with sugar or khoa powder. 8 Wrap into silver foil.	**Condition(Given):** Pan, knife. Chhana, sugar, khoa & silver foil. **Task (What):** Prepare Cham-cham. **Standards (How well):** Cham-cham for Chhana prepared having firm body & close knit texture.	• Introduction of cham • Cham-cham production. • Characteristics of the cham-cham • Market potential & economy of production. • Decoration of the sweets • Procedure

Tools/equipment: Pan, knife.
Safety:

Task Structure

TASK NO: 8 Prepare Sita bhog.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Mix maida & buffalo milk Chhana. 4 Grind to smooth pasty form. 5 Prepare noodle like strands by pressing the mixture through a salve. 6 Deep fry in refined oil & immerse in sugar syrup.	**Condition(Given):** Pan, ladle, maida, buffalo milk, frying oil. **Task (What):** Prepare Sita bhog. **Standards (How well):** A sweet produced having rich taste.	• Introduction of sits bhog • Characteristics of sita bhog • Chhana preparation • Procedure

Tools/equipment:
Safety:

Task Structure

TASK NO: 9 Prepare Chhana Gaja.		
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Mix Chhana with 50% sugar, suji & maida. 4 Knead to paste. 5 Prepare balls with hands. 6 Cook in concentrated boiling sugar syrup till dark.	**Condition(Given):** Pan,Chhana, sugar , maida & suji. **Task (What):** Prepare Chhana Gaja. **Standards (How well):** Chhana Gaja produced with rich flavour, taste & dark colour.	• Introduction of chhana gaja • Chhana preparation. • Characteristics of gaja sweets • Procedure

Tools/equipment:
Safety:

Task Structure

TASK NO: 10 Prepare Chhana kheer.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Boil buffalo milk in pan over open fire to thick consistency resembling evaporated milk. 4 Boil till it gets caramelized. 5 Serve sprinkle raw granules Chhana over the caramelized milk.	**Condition(Given):** Buffalo milk, Pan, Chhana **Task (What):** Prepare Chhana kheer. **Standards (How well):** A highly nutritious product prepared with rich taste & caramlized flavour.	• Introduction of chhana kheer • Caramlization reaction • Characteristics of chhana kheer • Procedure

Tools/equipment:
Safety:

Task Analysis

TASK NO: 11 Prepare Chhana Pakora.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1 Receive instructions. 2 Collect necessary tools, equipment & materials. 3 Mix Chhana with maida gram flour & sugar. 4 Knead the mixture to a paste. 5 Sprinkle the paste over hot oil for frying. 6 Soak the fried pieces in sugar till they become quite hard.	**Condition(Given):** Pan, ladle, Chhana, maida, gram flour, frying oil. **Task (What):** Prepare Chhana Pakora. **Standards (How well):** Chhana pokora produced with sweet & rich taste.	• Introduction of chhana pokara • Sugar syrup preparation • Chhana preparation • Characteristics of chhana pakora • Procedure

Tools/equipment:
Safety:

Module: 2

Sub-module: 3: Cultured / Fermented Products

Description:

This sub module consists of knowledge and skills related to cultured / fermented milk processing technology. It consists of tasks related to cultured / fermented milk products making. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance to the task.

Objective:
After its completion of this module the trainees will be able:

- To prepare Mishti doi
- To prepare Shrikhand (sikarni) by traditional method.
- To prepare Kadhi by traditional method.
- To prepare Raita
- To prepare Dahi vada

Tasks:

1. Prepare Mishti doi
2. Prepare Shrikhand (sikarni) by traditional method.
3. Prepare Kadhi by traditional method.
4. Prepare Raita
5. Prepare Dahi vada

Task Structure

TASK NO: 1 **Prepare Misti Doi**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take cow, buffalo or mixed milk. 4. Add sugar @ 6% caramel @ 0.1 to 0.12. 5. Boil & partially concentrate by simmering over low fire. 6. Hold for 20 minutes while boiling or at 90 deg Celsius. 7. Cool to ambient temperature or to 40 deg Celsius. 8. Add lactic culture (Dahi culture) @ 1%. 9. Fill in the earthen or plastic cup. 10. Inoculate at 40 deg Celsius till firm body curd has set. 11. Transfer to cold store.	**Condition(Given):** Pan, ladle, earthen plastic cups, Incubator, milk, sugar, caramel, dahi, eathen cups.. **Task (What):** Prepare mishti doi. **Standards (How well):** Fermuted milk produced having creams to light brown colour, firm consistency, smooth texture & pleasant aroma.	• Concept of fermented products • Types of fermented product • Introduction of misti doi • Preparation of misti doi • Characteristics of misti doi • Dahi culture preparation & relation • Procedure

Tools/equipment: Pan, ladle, earthen plastic cups, Incubator
Safety:

Task Structure

TASK NO: 2 Prepare shrikhand (Sikarni) by traditional method.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take cow, buffalo or mixed milk in a venal. 4. Boil & cool to 30-35 deg Celsius. 5. Incubate with dahi culture @ 0.5-1% (for previous day production). 6. Leave the milk at room temperature until it sets firm. 7. Stir & hand in a muslin cloth for 10-12 hrs to drain off the whey. 8. Mix chakka with sugar usually 50-60 % of curd quality, flavour, colour, herbs & spices. 9. Fill in the cup, chill & serve.	**Condition(Given):** Milk heating vessel, plunger, muslin cloth, milk, dahi,muslin cloth, sugar & flavouring & colouring materials. **Task (What):** Prepare dahi. Prepare muska. Prepare shrikhand. **Standards (How well):** A product with light yellow color produced having smooth texture & light acidic aroma.	• Introduction of sikarni • Method of preparation • Yield of muska (chakka) • Lactic culture • Commonly used additives. • Yield of shrikhand • Shelf-life of shrikhand • Shrikhand preparation by factory method • Procedure

Tools/equipment: Milk heating vessel, plunger, muslin cloth.
Safety:

Task Structure

TASK NO: 3 Prepare Kadhi by traditional method.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials 3. Take stirred dahi or butter milk. 4. Add 5-8% of besan (Bengal graw flour) which acts as thickening agent. 5. Prepare fried balls of spiced Bengal graw (besan) butter (pakora). 6. Add pakora as prepared above & boiled vegetables at the end of preparation. 7. Add salt and sautéed onion along with spices to the kadhi. 8. Use dahi in kadhi preparation is made for milk with 0.8-1% fat.	**Condition(Given):** Karahi, ladle.,dahi ,besan, frying oil & spices. . **Task (What):** Prepare Kadhi **Standards (How well):** Kadhi with milk acidic taste & cooked flavour prepared for durned dahi.	• Introduction of khadi • Method of preparation • Frying the balls of besan • Characterize taste of kadhi • Dahi preparation & churning • Procedure

Tools/equipment: Karahi, ladle.
Safety:

Task Structure

TASK NO: 4 **Prepare Raita.**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials 3. Take dahi & mix it with a spoon to smoothness by adding a small quality of milk to develop soft consistency. 4. Add salt, black pepper & fried mustard seeds or roasted cumin seeds & mix well. 5. Add boiled or raw vegetables or besan granules & mix thoroughly. 6. Add fruits now. 7. Garnish the mixture with little red pepper, garam masala & chopped mint (coriander leaves and allow to stewed undisturbed for few minutes to equaliterate & develop uniform flavour. 8. Prepare fried batter of besan or moong dal by taking 100 gm of besan / moongdal flaur in 100 ml of water. 9. Beat the mixture to incorporate air & develop a light body. 10. Add ¼ tea spoon of salt & baking powder while beating the mixture. 11. Run the batter through a perforated mould dye & fry the small granules at 185 deg Celsius until they are light brown in colour. 12. Sink the granules in salted boiling water & squeeze the excess water. 13. Mix the granules in dahi, which absorb a considerable amount of water to yield raita relatively thick in consistency.	**Condition(Given):** Pan, ladle, knife, hand beater, dahi, milk, salt, spices, vegetables. **Task (What):** Prepare Raita. **Standards (How well):** A popular delicacy taken along with rice prepared for dahi & other ingredients.	• Requirements of dahi for raita • Different varieties of raita • Different ingredients used for raita • Preparation of fried besan battens for raita • Procedure

Tools/equipment: Pan, ladle, knife, Hand beater.
Safety:

Task Structure

TASK NO: 5 **Prepare Dahi vada.**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take equal quantity of urad dal & grau dal or urad dal only (500gm) (halves with skin). 4. Soak in water over night & remove the skin. 5. Grind the dal yielding very soft texture. 6. Add ½ tea spoon garam masala 0-1 teaspoon of red chili powder, salt ginger & other ingredients as required. 7. Mix all the ingredients and shape into patties of 5-7 cm diameter & 1-2 cm thickness. 8. Fry the patties in ghee or oil at 185 deg Celsius to cook properly to golden brown colour. 9. Soak in salted water for 10 min & squeeze to remove excess water oil, helping to develop pure texture. 10. Immerse the patties in dahi which has been beaten earlier to trimmer consistency. 11. Garnish the patties with garam masala, chili powder, & some times with chopped mint leaves. 12. Use sweet sour tamarind (imli) sauce with coriander, south (ginger powder) raisin etc. 13. Pour the above sauce above the dahi vada before serving.	**Condition(Given):** Karahi, Grinder, Frying pan, hand bitter., urad dal (mas dal), garam masala,spices, frying oil, salt **Task (What):** Prepare vada/bhlla for urad dal & grand al or gourd coconut. Fry the patties & color with dahi & other spices. **Standards (How well):** Two varieties of dahi vada prepared using urad dal, gourd dal & groud coconut and dahi having salty & acidic taste.	• Difference between raita & dahi vada • Serving the dahi vada. • Spices used in dahi vada preparation • Procedure

Tools/equipment: Karahi, Grinder, Frying pan, hand bitter.
Safety:

Module: 2

Sub-module: 4: Milk Based Puddings / Desserts

Description:

This sub module consists of knowledge and skills related to milk based pudding and desserts making technology. It consists of tasks related to milk based pudding and desserts making. Each task structure consists of task steps, terminal performance objective [TPO], and related technical knowledge essential for the effective performance of the task.

Objective:
After completion of this module the trainees will be able:

- To prepare Kheer
- To prepare Lauki kheeer
- To prepare Sohan halwa
- To prepare Gajar-ka-halwa
- To prepare Kaju burfi

Tasks:

1 Prepare Kheer
2 Prepare Lauki kheeer
3 Prepare Sohan halwa
4 Prepare Gajar-ka-halwa
5 Prepare Kaju burfi

Task Structure

TASK NO: 1 **Prepare Kheer.**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take milk preferably whole milk & boil on open fire. 4. Add presoaked rice @ 5-6% of weight of milk and 6-8% of sugar in simmering milk. 5. Continue heating till the rice softens & shows the signs of gelatisation, leading to substantial thickening. 6. Add chopped nuts and cardamom. 7. Dehydrate milk upon 33% of original volume to get better consistency & flavoour 8. Serve while hot or cooled.	**Condition(Given):** Pan, ladle , whole milk, rice, sugar, **Task (What):** Prepare Kheer **Standards (How well):** Kheer with white to slightly brownish in colour & rich sweet taste prepared.	• Concept of desserts • Types of dessert • History & background of kheer. • Nutritional value. • Selection of rice for kheer (Basmati broken rice is considered best). • Selection of milk for kheer preparation. • Selection of other substitute of rice • Procedure

Tools/equipment: Pan, ladle.
Safety:

Task Structure

TASK NO: 2 **Prepare Lauki kheer.**

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 50gm of rice, wash & soak for 3 hours. 4. Crush the rice lightly and add in boiling milk till the rice becomes tender. 5. To this, add 250 gm of sugar & continue cooking till the milk thickness. 6. Take 250 gm of seedless lauki (Bottle gourd) grate it & steam for 15 minutes is make it tender. 7. Drain the excess water for the steamed & grated lauki by placing on solve. 8. Mix the above steamed lauki in milk mixture & cook for 15 minutes. 9. At last, add 100 gm of khoa, 1-2 gm of cardamom powder & custard powder (5 gm dispersed in 15ml plain water). 10. Further cook for 5 minutes while stirring. 11. Remove for the fire. 12. Garnish the top portion with silvered pistachio and flavored with kewda essence (1 tps) at the time of serving.	**Condition(Given):** Pan, ladle, milk, sugar, Lauka, khoa, cadamom powder, custard powder.. **Task (What):** Prepare the materials required for lauki kheer. Prepare lauki kheer using above ingredients. **Standards (How well):** Lauki kheer produced having light greenish yellow, shredded and cooked bottle gourd interspersed in slightly viscous milk.	• Importance of Lauki kheer • Characteristics of lauki kheer • Ingredients used in kheer making • Decorating the kheer • Procedure

Tools/equipment: Pan, ladle.
Safety:

Task Structure

TASK NO: 3 Prepare Sohan Halwa.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take whole buffalo milk & soil. 4. Leave out side for little acidity development (up to 0.18% lactic acid). 5. Mix angoori atta & normal in the ratio 1:2. 6. Take approximately 150 gram of above mixture and add into one litre of milk assuring that there is no hump. 7. Boil the mixture with constant stirring. 8. Add sugar @ 10-15% of milk when almost all the moisture has Crapo rated. 9. Continue stirring and when mixture is dry, add ghee @ 5% of the milk to facilitate stir frying. 10. When halwa attains a brown colour, turn on a flat surface & level. 11. Cut into desired shape & size with a sharp knife when the product is set. 12. Add nuts before cutting.	**Condition(Given):** Pan, ladle, buffalo milk, angoori- atta, wheat flour, sugar, ghee, plank & knife. **Task (What):** Prepare sohan halwa. **Standards (How well):** A wheat based product with extremely chewy texture prepared having groove color & sweet taste.	• Product's characteristics • Preparation of wheat to be used for making sohan halwa • Type of atta to be the used • Procedure

Tools/equipment: Pan, ladle, plank, knife.
Safety:

Task Structure

TASK NO: 4 Prepare Gajar-ka-halwa.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Clean & thinly peal the inedible surface skin of the carrot. 4. Grate finely & pre-cook with steam to import requisite tenderness. 5. Add milk & sugar & cook on low flour with intermittent stirring during which milk boils & froths. 6. Add shredded carrots and concentrated milk form a lumpy mass at the cooking progress 7. With further cooking, free fat oozes out from the lumpy mass imparting a moderate frying effect. 8. Observe the colour development to golden / reddish grown coour partly due to the controlled caramelization of sugar & milk. 9. Increase the rate of scrapping and stirring towards the finishing stage. 10. Now, add saffron, cardamom, raisins, slivered almonds & shredded cashew nuts and surface is topped with silver foil. 11. Serve hot.	**Condition(Given):** Pan, ladle, milk, carrot, sugar, colouring & flavourings, nuts. **Task (What):** Prepare Gajar-ka-halwa. **Standards (How well):** Gajar-ka-halwa, bright reddish with certain darkened but glossy fragrant of grated carrot with lumpy body.	• Nutritive value of Gajar-ka-halwa • Quality of carrot. • Characteristics of Gajar-ka-halwa • Topping / dressing of sweets • Procedure

Tools/equipment: Pan, ladle.
Safety:

Task Structure

TASK NO: 5 Prepare Kaju Burfi.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take grated khoa & sugar and mix well. 4. Heat in a heavy bottom shallow pan with continuous stirring to dissolve the sugar. 5. Add ground cashew & powdered cardamom when the temperature is reached. 6. Continue cooking with constant stirring till a soft lump is formed that doesn't stick to the side. 7. Spread over greased try by rolling on the surface to the desired thickness. 8. Apply silver foil & allow cooling & setting. 9. Cut into desired size & shape & pack.	**Condition(Given):** Heavy bottom shallow pan, ladle, tray, khoa sugar. Cashew nuts, cooking oil, silver foil. **Task (What):** Prepare kaju burfi. **Standards (How well):** Kaju Burfi with delicious taste produced containing cashew nuts, sugar, milk solid & certain other ingredients.	• Composition & nutritive value of kaju Barfi • Shelf life of the burfi. • Cost analysis • Decorating the burfi • Procedure

Tools/equipment: Heavy bottom shallow pan, ladle, tray.
Safety:

OJT for Dairy Product and Sweets Maker

Overview of OJT

On-the-Job Training is an individual training approach designed to train the learner to perform certain task while working in the job. It creates appropriate working environment for the teaching learning activities. Training is relevant as the learner is being trained in a real work setting. The aim of the On the Job Training (OJT) is to provide the learner the maximum experience & exposure of "The World of Work".

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Objective of OJT

After completion of OJT the trainees will be able to:

1. To practice/ apply the skills/ knowledge developed by the trainees through institutional training in the real world of the related occupation
2. To practice the skills gained through institutional training that the trainees have not got enough opportunity to practice and apply them due to the institutional constraints and or limitation
3. To gain world of work experiences
4. To acquire skills and knowledge developed in the related field of occupation
5. To make trainees familiar with the future occupation/ job they are going to hold
6. To provide trainees with supporting skills and knowledge necessary for the related occupation
7. To make trainees familiar with the day to day administrative / management activities applicable in their related occupation.

OJT placement

The related training institute needs to perform the followings for OJT placement of the trainees.

Make list of the employer agencies:

1. Make list of the Employer agencies:
   (a) Dairy industries and sweet shops run by the government / Private agencies
   (b) Dairy industries and sweet shops run by NGOS / INGOS
   (c) Others
2. Select the employer agencies / related industries:
   (a) Obtain the curriculum
   (b) Match the skills specified in the curriculum with the occupational activities being conducted by industries.
   (c) Select the employer agency for OJT which: -
      - Is well equipped and can provide maximum opportunity to practice /develop / apply the skills and knowledge included in the curriculum
      - Can provide recently developed knowledge / skills in the related occupation
      - Has the possibility to offer job for the trainees having satisfactory job performance after the completion of OJT.
      - Can offer facilities to the trainees during OJT.
3. Contact employer agency for OJT
4. Make agreement with employer agency regarding OJT.
5. Orient the employer regarding supervision & evaluation of the trainees on OJT.

6. Assign the trainees who have passed institutional training to the selected employer agencies
7. Orient the trainees for OJT (Objective, curriculum, activities in which they have to be involved, recording, supervision & evaluation etc.)
8. Send Trainees with official letter for OJT.
9. Manage / provide salary (at least to cover the living cost) to the trainees.
10. Have initial supervision to help socialize and guide the trainees sent for the JOT.
11. Have periodic supervision and evaluation of the trainees at least three times at an interval of two months during the period of OJT.
12. Collect feedback as inputs for the revision of the curriculum for future.
13. Keep records.

Orientation to the Trainees for OJT

The trainees who are placed on OJT are to be oriented by the related institute about the followings:

1. OJT Activities
2. OJT Evaluation
3. OJT curriculum

Suggestion for Trainees for OJT

1. Receive orientation for OJT provided / delivered by the related Training institute
2. Obtain curriculum
3. Obtain official letter for Joining OJT
4. Contact the assigned organization
5. Maintain attendance
6. Manage Accommodation
7. Obtain Job description
8. Visit / observe the activities related
9. Study critically the related units of industry
10. Obtain curriculum
11. Match the tasks specified in the curriculum with the actual tasks / activities being carried in the industry.
12. Make lists of tasks:
    (a) You need to practice for confidence building
    (b) You need to practice the skills that are not covered in the institutional Training
    (c) You need to practice the skills that are not included in the curriculum but need to perform in the real world of the occupation for successful OJT performance.
    (d) Recently developed skills through research applicable to your level of job after OJT.
13. Finalize the Task list consulting with:
    (a) Your supervisor &
    (b) Instructor
14. Practice / perform / develop as many related skills as possible related to your level of job.
15. Perform related administrative functions.
16. Perform / develop skills on cue the duties and tasks specified in the job description provided by the employer during OJT.
17. Get help form the senior (s) / supervisor (s) to perform the tasks \develop skills as maximum as possible.

18. Develop daily diary / Log book
19. Fill the daily diary / Log book
20. Get signed by your supervisor regularly
21. Seek & follow suggestion from seniors
22. Show excellent job performance to influence your senior (s) / supervisor so that they could will recommend to the employer to offer you the job after OJT.
23. Develop professionalism.

OJT Evaluation:

The OJT will be evaluated by:

- Related supervisor of organization
- Related instructor/supervisor of the training institute
- CTEVT (representative or assigned expert if needed)

The marks distribution for the OJT evaluation of the trainees will be as follows:

S.N.	Evaluators	Marks Distribution	
		Full Marks	Percentage
1.	Related Supervisor of the industries / Organization	50	50%
2.	Related supervisor / instructor of the training institute	25	25%
3.	External expert	25	25%
Total		**100**	**100%**

Competencies to be performed during OJT

Trainees are suggested to perform all the critical competencies mentioned above under each module of this **Dairy Product / Sweets Maker** curricular program

List of Tools and Equipment

Dairy Product Maker

1. Adulteration testing kit
2. Aluminum can
3. Bacteriologies pipette
4. Batch pasteurizer
5. Batch sterilizer
6. Buty renter stopper, key
7. Butter churn
8. Buty renter brush
9. Buty renter stand
10. Butyro meter
11. Cheese mould
12. Country fage
13. Electric balance
14. Filter cloth
15. G. Burette
16. Glass Beaker
17. Gradual pipette
18. Hand butter moulding set
19. Homogenizer
20. Ice-cream machine
21. Incubator
22. Lactometer
23. Milk chilling vat
24. Milk container
25. Milk measuring device
26. Milk pipette
27. Milk pipette brush
28. Milk sampler
29. Oven
30. Paneer hoops
31. Plastic cups
32. Plunger
33. Product packing polythine film
34. Sample bottle
35. Test tube
36. Thermometer
37. Yoghurts incubator

Sweet Maker

1. Basket
2. Bata
3. Bhatti
4. Big cholne
5. Butter paper
6. Cap
7. Chabi(Key)
8. Chimta
9. Cholne Khurpi
10. Cold dish plate
11. Cooking pot
12. Cylinder
13. Décor Kisti
14. Dust bean
15. Flower knife.
16. Fry pen.
17. Jhari
18. Karai
19. Khurpi
20. kistey
21. Knife
22. Ladder
23. Micro oven
24. Mixer grinder
25. Napul
26. Oven Range
27. Plain pata
28. Range
29. Roller
30. Round pata(Plate)
31. Scale(Listi)
32. Show case
33. Stove
34. Sweet cap
35. Washing Bashain.
36. wodden ladder.

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