CURRICULUM GUIDE

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Junior Dairy Technician

(A Modular Approach)

Council for Technical Education and Vocational Training

Curriculum Development Division

Sanothimi, Bhaktapur

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Introduction

The competency based and market oriented curriculum guide for **Junior Dairy Technician** is designed to produce employable multi skilled workforce equipped with knowledge, skills, and attitudes related to the occupation. In this curriculum, the trainees will practice skills of dairy production and sweet making. 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.

The feature of this curriculum is to focus on entrepreneurship development and marketing skills in order to create self-employment opportunity. Skills of mathematics, English, and dairy technology / sweet making are focused in this curriculum. It is considered that these knowledge and skills included will prepare the trainees to learn the specialized contents so that they can be competent technician needed for the occupation. Another major feature of this curriculum is the incorporation of the drop-out youths who have only the class eight schooling experience. ***The curriculum is designed on the basis of modular modality so that it will be successful to meet the needs of individuals, community, and industry.***

Aim

The main aim of this program is to produce employable skilled dairy technicians and sweet makers who could provide dairy products and sweet making services in the dairy and sweet 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.

Objectives

The main objective of this program is to produce skilled workforce in the field of dairy technology including sweets making. Moreover, the general objectives of the program are:

1. To develop the concept on dairy technology and sweet making
2. To learn and apply simple English language for communication
3. To perform simple mathematical problems related to occupation
4. To acquire concept of science and hygiene related to the occupation
5. To develop entrepreneur skills essential for to dairy and sweet making occupation
6. To develop generic skills for adopting in the new situation and technologies.
7. To perform collection, reception and processing of milk
8. To perform dairy laboratory tests
9. To prepare mother culture for milk products
10. To produce milk products
11. To prepare desiccated milk based sweets
12. To prepare heat acid coagulated products.
13. To prepare cultured/fermented products
14. To prepare milk based puddings / desserts

Course Description

This curriculum guide is based on the job required to be performed by a multi skilled Technician for dairy and sweet making industries in Nepal. Therefore, this curriculum guide is designed to equip the trainees with skills & knowledge of the field of dairy and sweet making technology. This curriculum is designed in modular approach with the prerequisite of basic general course. The basic general course consists of English, Mathematics, Science, Introductory Dairy, and Sweet Making Technology. Module one

consists of dairy technology, milk processing and milk products. Module two comprises of processing and production of sweet items. Module-three deals with entrepreneurship development, sales and marketing of milks and milk products, basic accounting, presentation of product, and generic skills development. 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.
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.

Course duration
The total duration of the course extends over 12 months (i.e. 8x130 hours or 1040 hours in house training + 4x160 hours or 640 hours OJT=1680). The total duration of in-house training and OJT are 8 months and 4 months respectively. After the completion of all modules, the trainees should undergo OJT for the period as mentioned on the course structure. Trainees will learn and practice the knowledge and skills at the institutional level and apply them during the period of OJT so as to have exposure/ experience of the "world of work." Entrepreneurial skills will be provided at the end of training under module 3 to make the trainees competent and orient them for self-employment.

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

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 guide.

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 eight class pass
- Nepali citizen
- 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: Lecture, Discussion, Assignment, Group work.
- Practical: Demonstration, Observation, Guided practice and Self-practice.

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 sub-module.
- 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 in each module at institution.
- 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

- 1:10 for practical classes
- For theory, as per the class room situation

Suggestions for Instruction

1. **Select objectives**
   - Write objectives of cognitive domain.
   - Write objectives of psychomotor domain.
   - Write objectives 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 objectives 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 objectives, 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.

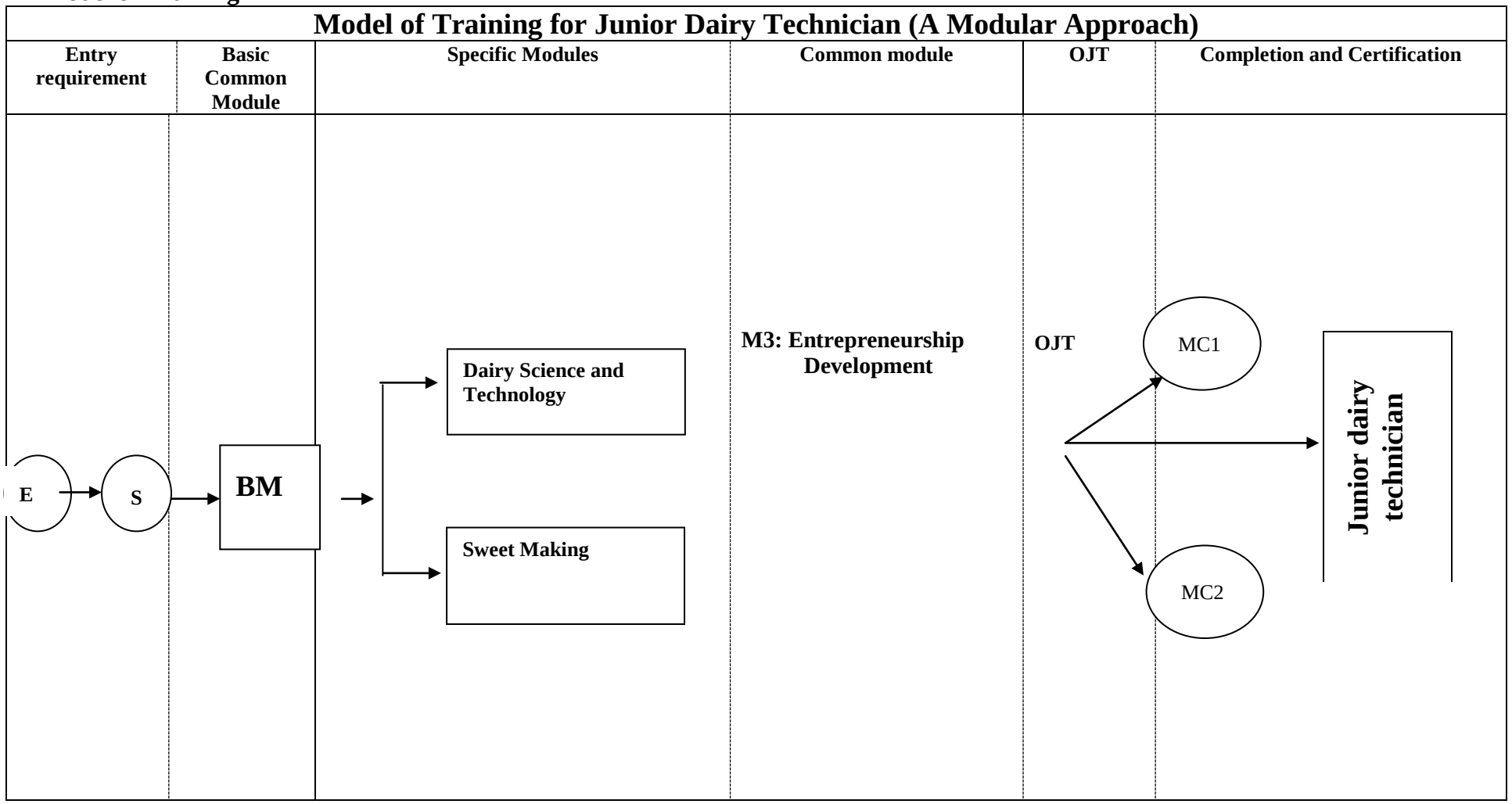
Certificate Requirements

The related training institute will provide the training certificate of "**Junior Dairy Technician"** 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.

Skill Testing Provision

The graduates who have the completion certificate of this program may sit in the skill test examination of level two (L- 2).

Model of Training



Course Structure for Junior Dairy Technician

S.N.	Code	Modules and sub-modules	Nature	Total hours	Full marks
1.	**M 0**	**Mo: Basic Module**	**T+P**	**130**	**100**
		• *Care and management of dairy/milch animals	*T+P	*	
		• Basic Concepts of Dairy Technology • Applied English • Basic Mathematics • Basic Science and Basic Hygiene			
2	**M 1**	**M1: Dairy Science and Technology** • Basic Milk Processing Technology • Dairy Technology & Processing of Milk Products • Laboratory Tests • Equipments Cleaning& Sanitization	**T+P**	**520**	**400**
3.	**M 2**	**M2: Sweet Making** • Desiccated milk based sweets • Heat Acid Coagulated products • Cultured / Fermented Products • Milk based Puddings / Desserts	**T+P**	**260**	**200**
4	**M 3**	**M3: Entrepreneurship Development** • Generic Skills • Entrepreneur Skills • Sales and Marketing • Accounting and Presentation of Skills	**T+P**	**130**	**100**
Total				**1040**	**800**
On-the-Job Training (4 months)			P	640	400
Grand total				**1680**	**1200**

Note: OJT commences after the completion of above-mentioned particular module(s)

*It is not a compulsory sub-module. However, the interested institutes may offer this sub- module if they feel its need. Offering of this sub-module will increase the total duration of the program by 30 hours. There will be on change in full marks. The trainees should also need to practice skills related to this sub-module during OJT if this sub- module is offered The detail is given at the end of this curriculum under the title" **An Additional Basic Sub-Module**".

Module Code: M0

Module Title: Basic Module

Description

This module is designed to equip trainees with the knowledge and skills on Basic General Course as a prerequisite for mastering any specific module/s course. This course provides foundation for modular approach training in dairy and sweet making technology. This course deals with Basic English, Mathematics, Basic Science, Basic Hygiene and Introductory contents of dairy technology and sweet making related to all modules as mentioned in the course structure.

Aim

This module aims to equip trainees with knowledge and skills to master any specific module.

Objectives

After completion of this core module the trainees will be able to:

1. Develop the basic concept on dairy technology and sweet making
2. Learn and apply simple English language for communication
3. Perform simple mathematical problem related to occupation
4. Acquire concept of science and hygiene related to the occupation

Prerequisite: Nil

Duration: 130 hours

Module Structure (M 0)

S.N.	Code	Sub-modules	Nature	Total hours	Full marks
1.	SM 0.0	*Care and management of dairy/milch animals	*T+P	*	
2.	SM 0.1	Basic Concepts of Dairy Technology		130	100
3.	SM 0.2	Basic English	T		
4.	SM 0.3	Basic Mathematics	T		
5.	SM 0.4	Basic Science & Hygiene	T		
Total				**130**	**100**

*It is not a compulsory sub-module. However, the interested institutes may offer this sub- module if they feel its need. Offering of this sub-module will increases the total duration of the program by 30 hours. There will be on change in full marks. The trainees should also need to practice skills related to this sub-module during OJT if this sub- module is offered The detail is given at the end of this curriculum under the title" An Additional Basic Sub-Module".

Module Code: M 0
Sub module Code: SM 0.1
Sub module Title: Basic Concepts of Dairy Technology

Description

This course is designed to help trainees to provide knowledge and skills on Basic concept of Dairy and Sweet Making Technology. This course deals with the basic concept on dairy and sweet technology. However, this course is offered as common basic sub module both dairy and sweet module taker.

Duration: 66 hrs

Competencies in dairy technology

1 Develop the concept milk and its composition
2 Describe physical properties of milk
3 Produce clean milk
4 Prepare for milk collection
5 Sample milk
6 Measure volume of the milk
7 Keep farmer's record
8 Filter milk
9 Collect milk at farm level
10 Store the milk
11 Chill the milk
12 Sell milk
13 Dispatch the collected milk to chilling centre/factory
14 Receive milk at chilling centre/factory

Task Analysis

TASK NO. 1 Develop the concept milk and its composition

Time : 3 hrs
Theory : 3 hrs
Practical: hrs

Performance Steps	Terminal Performance objectives	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 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

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Task Analysis

TASK NO. 2 Describe physical properties of milk

Time : 5 hrs
Theory : 5 hrs
Practical: 2 hrs

Performance Steps	Terminal Performance objectives	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

Task Analysis

TASK NO. 3 Produce clean milk.

Time : 7 hrs
Theory: 5 hrs
Practical: 2 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Segregate sick animal from healthy one. 3. Clean animal before milking. 4. Clean utensils for milking. 5. Clean hands of milkers. 6. Transport the milk in utensil covered with lid/cloth.	**Condition (Given):** Milch animal, utensils for milking and transportation **Task (What):** Produce clean milk. **Standard (How well):** Milk with minimum contamination produced & Transported.	➢ Concept of clean milk ➢ Animal disease affecting milk quality ➢ Antibiotics used for treatment ➢ Utensils to be used for milking & transportation ➢ Bacterial contamination

Task Analysis

TASK NO. 4 Prepare for milk collection.

Time : 4 hrs
Theory : 1 hr
Practical: 3 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collect necessary tools, equipment & material 3. Clean the milk cans, plunger, sampling dipper, strainer & collection tray. 4. Arrange the sample measures bottles in a tray. 5. Queue up the farmers. 6. Obtain the milk collection day book. 7. Prepare the testing equipment & chemicals.	**Condition(Given):** Necessary tools equipment and materials **Task (What):** Prepare for milk collection. **Standard (How well):** All the utensils & equipments made ready for milk collection.	➢ Equipments & utensils needed for milk collection ➢ Maintenance of hygienic condition at collection centre

Task Analysis

TASK NO. 5 Sample milk.

Time : 4 hrs
Theory : 1 hr
Practical: 3 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collect necessary tools, equipment & material 3. Test the COB & organo-leptic test of the milk. 4. Mix the milk thoroughly with plunger. 5. Dip the sampling dipper & take out the milk. 6. Put all the milk of sampler in a sample bottle in case of single container/can. 7. Take composite sample in case of more than one can/containers, 8. Give the serial number to the sample bottle. 8. Put the sample bottle in tray serially.	**Condition (Given):** Necessary tools equipment and materials **Task (What):** Sample milk. **Standard (How well):** Representative sample of the milk drawn before collection.	➢ Concept of milk sampling ➢ Type of milk sampling (composite sampling) ➢ COB & organoleptic test ➢ Sampling procedure

Tools/equipment: Plunger, sampling dipper, sample bottles, sample bottle tray.

Task Analysis

Time : 4 hrs
Theory : 1 hr
Practical: 3 hrs

TASK NO. 6 Measure volume of the milk.

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collect necessary tools, equipment & material 3. Place the stainless steel collection tray on a flat table. 4. Place the measuring liter on the tray. 5. Ask the farmers to pour the milk into the measure. 6. Record the volume of the milk in collection day book corresponding to farmer's name & number	**Condition (Given):** Milk brought by farmers at collection centre **Task (What):** Measure volume of the milk. **Standard (How well):** Milk from the farmers measured without making loss of factory or farmers in a transparent way. Measured volume of the milk.	➢ Concept of volume measurement ➢ Government approved measuring sets ➢ Deformation of measuring sets ➢ Causes of shortage of milk during collection ➢ Volume measuring procedure

Tools/equipment: Collection tray, ½ l & 1 l measuring set.

Task Analysis

TASK NO. 7 Keep farmer's record.

Time : 6 hrs
Theory : 1 hr
Practical: 5 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Prepare the format of farmer's individual record. 3. Prepare format of quarterly/weekly progress report. 4. Enter the figure of volume, fat & CLR into the farmer's individual record for collection/day book & testing record. 5. Calculate the fat kg., SNF kg and price of milk and enter into the individual record on daily basis. 6. Sum the quantity of milk, fat, SNF & price at the end of payment period.	**Condition(Given):** Format of farmer's record is to be maintained for payment & progress report. **Task (What):** Keep farmer's record. **Standard (How well):** Individual farmer's record maintained to facilitate the payment & making progress report as per the format supplied	➢ Concept of farmer" record keeping ➢ Calculation of fat & SNF. ➢ Milk pricing system ➢ Record keeping system

Task Analysis

TASK NO. 8 Filter milk.

Time : 4 hrs
Theory : 1 hr
Practical: 3 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collection necessary tools, equipment & material 3. Clean the milk strainer & sieve. 4. Put white muslin cloth on the strainer with sieve & cloth on the milk can. 5. Place the strainer with sieve & cloth on the milk can. 6. Pour the milk into the strainer.	**Condition (Given):** The milk to be filtered and related tools equipment and materials **Task (What):** Filter milk. **Standard (How well):** The milk filtered and all the visible particles removed & milk became clear	➢ Concept of milk filtering ➢ Source of foreign particles in the milk ➢ Natural color of the milk. ➢ Hygienic handling of the milk ➢ Filtering procedure

Tools/equipment: Source of foreign particles in the milk.

- Natural color of the milk.
- Hygienic handling of the milk.

Task Analysis

TASK NO. 9 Collect milk at farm level

Time : 5 hrs
Theory : 1 hr
Practical: 4 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collection necessary tools, equipment & material 3. Define milk & its composition. 4. List the factors affecting composition of milk. 5. List the factors affecting milk production & seasonal variation. 6. Perform the organoleptic test of the milk 7. Take the sample of the milk 8. Measure the volume & filter the milk 9. Keep the record of the volume & sample of the milk collected farmer's wise 10. Test the sample for CLR, Fat & SNF 11. Record the test result 12. Take the composite sample of the total milk collected 13. Test the composite sample 14. Calculate the loss/gain	**Condition (Given):** Raw milk from the farmers is to be tested, measured, and recorded. **Task (What):** Collect the milk from the farmers. **Standard (How well):** Milk collected, tested, weighed & recorded	➢ Organoleptic test ➢ Fat & SNF test ➢ SNF calculation ➢ Use of calculator ➢ Collection procedure

Tools/equipment:. Milk can, milk plunger, sample deeper, sample bottle, Star lactometer, Thermometer, Measuring sets.
Safety: Observe personal hygiene.

Task Analysis

TASK NO. 10 Store the milk.

Time : 4 hrs
Theory : 1 hr
Practical: 3 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive Instructions 2. Collect necessary tools, equipment & material 3. Clean the can or storage tank or chilling vat where milk is to be stored. 4. Chill the milk if possible. 5. Store the raw milk in shade protected from sunlight, if chilling is not feasible 6. Place the milk can in flowing water to cool, if running water is cool	**Condition (Given):** Raw milk to be stored safety & hygienically. **Task (What):** Store milk. **Standard (How well):** Raw milk stored in a safe & hygienic condition.	➢ Source of contamination ➢ Effect of temperature on storage of milk ➢ Milk storing technique

Tools/equipment: Storage vat, chilling vat, can, cooling facility..

Task Analysis

TASK NO. 11 Chill the milk

Time : 6 hrs
Theory: 1 hr
Practical: 5 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Clean & prepare the chilling machine/vat 4. Transfer the milk into the vat 5. Note down the temperature & time 6. Put on the machine &check the agitator & working performance of the machine 7. Put off the machine when temperature of the milk reaches 4 degree Celsius.	**Condition(Given):** The milk to be chilled, and milk chilling vat machine **Task (What):** Operate the chilling vat/machine & chill the milk **Standard (How well):** The chilling machine/vat operated & milk chilled to the standard.	➢ Concept of milk chilling ➢ Working of refrigeration system ➢ Electrical switches and controls ➢ Importance of milk chilling ➢ Chilling procedure

Tools/equipment: Milk chilling vat.
Safety: Check the voltage of the electrical supply.
Do not over chill the milk.

Task Analysis

TASK NO. 12 Sell milk

Time : 4 hrs
Theory: 1 hr
Practical: 3 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Separate the poor/average Quality of milk to be sold locally 4. Perform fat, SNF, organoleptic & C.O.B test of the milk. 5. Keep the record & decide the price of milk to the sold. 6. Sell the milk. 7. Get the money 8. Measure the quality & deliver to the consumer /purchaser. 9. Get the record certified by the in-charge of the centre.	**Condition(Given):** Some of the milk to be sold locally **Task (What):** Sell the milk to the purchaser **Standard (How well):** Local sale of the milk is carried out & recorded.	➢ Testing the milk ➢ Measuring the milk ➢ Price fixing ➢ Record keeping

Tools/equipment: Measuring Sets, Register.
Safety: Observe personal hygiene

Task Analysis

TASK NO. 13 Dispatch the collected milk to chilling centre/factory

Time : 5 hrs
Theory: 1 hr
Practical: hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Confirm the quantity of milk to be dispatched. 4. Get the composite sample & conduct the required tests. 5. Prepare dispatch slip 6. Transport the milk cans through head loads/vehicle or any other means as decided by collection centre in-charge.	**Condition(Given):** Collected milk to be dispatched safely to chilling centre/factory **Task (What):** Dispatch the collected milk to chilling centre/factory. **Standard (How well):** Collected milk dispatched, transported, & sold to chilling centre/factory. Milk receipt obtained.	➢ Testing the milk for quality ➢ Measuring the volume of the milk ➢ Means of local transportation ➢ Distance to be transported.

Tools/equipment: Cart load, Milk cans
Safety: Dispatch the milk as early as possible
Close the lid of the can tightly.

Task Analysis

TASK NO. 14 Receive milk at chilling centre/factory

Time : 5 hrs
Theory: 1 hr
Practical: 4 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment, & materials. 3. Clean & sanitize all the equipment required for milk reception. 4. Perform the organoleptic test of the milk. **If milk is good, Carry out the procedure as below otherwise** 5. Separate the good quality milk. Get the composite 6. Connect the hose pipe to the tanker 7. Take sample for the good milk. If milk is received from tanker, 8. Run the pump & note down the volume as indicated in flow meter or weighing scale. 9. Pour the milk into the weighing scale & note down then volume. In case of milk received from can. **In case of electronic milk reception system, follow the instruction given.** 14. Measure the temperature of the milk if received from drilling centre. 15. Prepare the loss/gain record comparing milk dispatched from chilling centre/collection centre. 16. Send back the milk receipt to corresponding collection centre/chilling centre.	**Condition(Given):** Milk from collection centre has to be received at chilling centre/factory dock. **Task (What):** Receive the milk at chilling centre/factory by quality & quantity wise. **Standard (How well):** Good quality & bad quality milk separated and received as per actual quantity & quality.	➢ Organoleptic test, OB/alcohol test of milk ➢ Composite sampling of milk. ➢ Separation of electronic milk reception devices.

Tools/equipment: Milk hose, plunger, sampling dipper, sample bottle, test tube, spirit lamp, pipette.
Safety: Observe personal hygiene
Open the lid of the can carefully.

Module Code: M 0

Sub module Code: SM 0.2

Sub module Title: Applied English

Description

This course is designed for the development of English language skills in reading, writing, and speaking for the trainees who involve in vocational as well as technical occupation. The focus of this sub module is to improve the conversational, comprehensive, and written skills needed for their day to day life.

S.No.	Descriptions	Time (hours)
1.	Read, understand, and use the technical terms in their sentences (with emphasis on trade related terminology).	2
2.	Read and understand simple occupation related comprehensive passages	2
3.	Read and follow English language instruction.	1
4.	Improve listening skills through participating in conversational programs between two persons or among the groups	3
5.	Explain related objects, drawing and projects, graphs, visuals by both written and speaking methods	3
6.	Participate on debate programs which are related to the training and advocate for the motion and also against the motion	2
7.	Write diary, notes, letters and applications	3
8.	Develop the spoken competencies required to apply for employment during the stage of Visa application to work station in abroad	3
	Total time(hours)	**20**

Module Code: M 0
Sub module Code: SM 0.3
Sub module Title: Basic Mathematics

Description
This module is designed to equip trainees with the knowledge and skills on Basic Mathematics as a prerequisite course for mastering any specific module/s. This course deals with mathematical skills such as unit conversion, fraction, measurement, simple geometric concept, volume and quantity calculation, cost calculation as well as other calculations related to their occupation.
Duration: 24 hrs
Competencies

1. Review basic mathematical calculations
2. Convert unit of measurement from one system to another system
3. Measure length, breadth and height of the object /geometrical figure
4. Measure mass/density/weight/capacity/Volume of solid and liquid
5. Calculate the quantity of materials required
6. Measure the quantity of work performed
7. Calculate the total cost of work performed
8. Calculate loss, profit and simple interests

Module Code: M 0
Sub module Code: SM 0.4
Sub module Title: Basic Science and Hygiene

Description
This course is designed to equip trainees with the knowledge of Science and Hygiene. This sub-module consists of four units dealing with the basic skills and knowledge about biology and hygiene.

Competencies	**Time (hrs)**
Unit: I: Biology	6
Develop the concept of: ➢ Living beings ➢ Cell ➢ Life process	
Unit: II: Hygiene	14
Orient with personal and work place hygiene ➢ Wash hand before commencing the particular work ➢ Apply antiseptics ➢ Aware with communicable/ transmitting diseases ➢ Use safe water ➢ Keep working area clean and tidy ➢ Sanitize utensil, crockery and cutlery ➢ Handle equipment and utensil ➢ Dispose garbage ➢ Develop the concept of food poisoning ➢ Preserve dairy items from contamination ➢ Concept of high risk foods their storage ➢ Control pest	
Total	20 hours

Text book: Science – Grade Six:- Printed by Janak Education Materials Centre Ltd. Sanothimi, Bhaktapur

Module Code: M1

Module Title: Dairy Science and Technology

Description

This module is designed to equip trainees with the knowledge and skills on Dairy Science and Technology as a specific module. This course provides skills and knowledge on dairy technologies, processing, and product. This course especially, deals with milk reception, milk processing, milk production, mother culture preparation, and milk based products manufacturing, various types of tests and cleaning and sanitization of glassware, pipelines, as well as equipment related to milk and milk products.

Aim

This module aims to equip trainees with knowledge and skills on dairy Science and Technology, especially, on dairy technologies, processing, and product necessary to be a dairy JTA.

Objectives

After completion of this core module the trainees will be able to:

1. Perform collection, reception and processing of milk
2. Perform laboratory tests
3. Prepare mother culture for milk products
4. Produce milk products

Prerequisite: Basic module completed

Duration: 520 hours

Instruction for trainer

The competencies are organized based on the principle of learning in each sub-module and level of their application. However, trainers are requested to deliver skills and technical knowledge of those specific competencies and to prepare trainees to practice these specific competencies before performing them as organized here either in accordance with the individual needs of the trainees or demanded by the competencies.

Module Structure (M 1)

S.N.	Code	Sub-modules	Nature	Total hours	Full marks
1	SM 1.1	Basic Milk Processing Technology	T+P	520	400
2	SM 1.2	Dairy Technology & Processing of Milk Products	T+P		
3	SM 1.3	Laboratory Tests	T+P		
4	SM 1.4	Equipments Cleaning& Sanitization	T+P		
Total				**520**	**400**

Module Code: M 1
Sub module Code: SM 1.1

Sub module Title: Basic Milk Processing Technology

Description

This course is designed to equip the trainees with knowledge and skills on Basic Milk Processing Technology require to be performed by this level. The course deals with preheat and separation of cream, reconstitute and recombinant, homonigenization, pasteurization, and phosphates test of the milk needed for their occupation.

Competencies

1. Prepare for milk processing.
2. Pre heat and separate the cream
3. Reconstitute & Recombine milk.
4. Homogenize the milk.
5. Pasteurize milk & cream
6. Store the pasteurized milk.
7. Fill up milk
8. Cool storage the filled pouches
9. Perform Phosphates test of pasteurized milk

Task Analysis

TASK NO. 1 Prepare for milk processing.

Time : 5 hr
Theory: 1 hr
Practical: 4 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Run the agitator of each storage tank having raw milk to be processed. 4. Draw the sample from the bulk milk. 5. Get the result after fat, SNF & COB test from laboratory. 6. Get the requirement of the pasteurized milk & milk products from marketing department. 7. Plan the production for each product. 8. Calculate the amount of fat to be separated. 9. Calculate the amount of SMP to be added.	**Condition(Given):** Necessary tools, equipments and materials. **Task (What):** Prepare for milk 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

Task Analysis

TASK NO. 3 Pre heat and separate the cream

Time : 5 hr
Theory: 1 hr
Practical: 4 hrs

Performance Steps	Terminal Performance objectives	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: Don't run the separator without liquid.
Don't open the separator unless the bowl completely stops.

Task Analysis

TASK NO: 4 Reconstitute & Recombine milk.

Time : 10 hr
Theory : 2 hr
Practical: 8 hrs

Performance Steps	Terminal Performance objectives	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 the 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: Do not use cold water for mixing the powder.
Cut and put the powder bag upside down into the hoper.

Task Analysis

TASK NO. 5 Homogenize the milk.

Time : 10 hr
Theory : 2 hr
Practical: 8 hrs

Performance Steps	Terminal Performance objectives	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: Always open water supply on piston before starting the homogenizer.
Increase the homogenizing pressure slowly

Task Analysis

TASK NO.6 Pasteurize milk & cream

Time : 15 hr
Theory: 3 hr
Practical: 12 hrs

Performance Steps	Terminal Performance objectives	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: Observe personal hygiene.
Check the operation of flow diversion valve.(FDV)

Task Analysis

TASK NO. 7 Store the pasteurized milk.

Time : 10 hr
Theory : 2 hr
Practical: 8 hrs

Performance Steps	Terminal Performance objectives	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 Analysis

TASK NO.8 Fill up milk

Time : 10 hr
Theory : 2 hr
Practical: 8 hrs

Performance Steps	Terminal Performance objectives	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 whe 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: Always shut the door while operating the machine
Do not insert finger or hand in between the sealing jaw while machine is running.

Task Analysis

TASK NO. 9 Cool storage the filled pouches

Time : 3 hr
Theory: 1 hr
Practical: 2 hrs

Performance Steps	Terminal Performance objectives	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 Analysis

TASK NO: 10 Perform Phosphates test of pasteurized milk

Time : 10 hr
Theory : 2 hr
Practical: 8 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Fill test tubes **A** (for analysis) and **C** (for control) with 10 ml. of distilled milk 1 tablet Lactognost I 1 tablet Lactognost II 4. Disintegrate after agitating the tablets, if necessary crush with a glass rod. 5. Measure with a pipette into test tube **A**, 1 milliliter of milk to be analyzed into test tube **C** measure 1 ml. of milk; heated to 85 deg .Celsius in boiling water thus destroying the phosphate enzyme, the temperature of the milk must not be above 40 deg .Celsius. 6. Incubate both test tubes in a water bath/ incubator at 37 deg. Celsius for 1 hour. 7. Add to both test tubes one level measuring-spoonful of Lactognost III. 8. Compare test tube **A** with the control tube **C** after 10 minutes. An eventually appearing blue color is to match with the color chart.	**Condition(Given):** A given sample of pasteurized milk has to be judged for its pasteurization efficiency using alkaline phosphates **Task (What):** Perform phosphates test of pasteurized milk **Standards (How well):** Pasteurize milk showed different color when compare with control.	➢ Concept of phosphates test ➢ Importance of alkaline phosphates enzyme in milk ➢ Legal aspect of performing this test ➢ Procedure of phosphates test

Tools/equipment: 2 absolutely clean test tubes, incubator or water bath at 37 deg. Celsius, water bath with boiling water, measuring spoon (lactognost), Control chart.

Module Code: M 1
Sub module Code: SM1.2
Sub module Title: Dairy Technology & Processing of Milk Products

Description

This course is designed to equip the trainees with knowledge and skills on Dairy Technology and Processing of Milk Products require to be performed by this level. The course deals with production of various mild products needed for their occupation.

Competencies

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

Task Analysis

TASK NO.1 Produce plain butter

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Steps	Terminal Performance Objectives	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 Analysis

TASK NO. 2 Produce table butter

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Steps	Terminal Performance Objectives	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 Analysis

TASK NO. 3 Produce Ice – cream

Time: 13 hrs
Theory: 3 hrs
Practical: 10 hrs

Steps	Terminal Performance Objectives	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 Analysis

TASK NO. 4 Produce butter milk.

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect necessary tools, equipment & materials. 3. Take the butter milk or paneer when in a batch pasteurizer. 4. Test for acidity and fat & SNF content. 5. Adjust to 1% fat & 5.5 % SNF by adding cream, milk or SNF as required. 6. Heat to 85 deg. Celsius. 7. Cool to 30 – 32 deg. Celsius. 8. Add dahi culture & leave for 12 hrs. 9. Add roasted jeera powders salt at the rate of 0.5%. 10. Mix well, pass through homogenizer without applying pressure. 11. Fill in poly pack & store in cold store.	**Condition(Given):** Milk, equipped lab and standard. **Task (What):** Produced salted butter milk with jeera flavour. **Standard (How well):** Refreshing butter milk drink produced as per the given standard.	➢ Concept of butter milk ➢ Quality testing of butter milk ➢ Acidity test ➢ SNF test ➢ Dahi culture ➢ Operation of homogenizer ➢ Procedure

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

Task Analysis

TASK NO. 5 Produce Lassi.

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance Steps	Terminal Performance objectives	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.

Task Analysis

TASK NO. 6 Produce Sikarni

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance Steps	Terminal Performance objectives	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 Analysis

TASK NO.7 Produce sterilized milk.

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance Steps	Terminal Performance objectives	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..

Task Analysis

TASK NO: 8 Produce Ghee from butter.

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 9 Produce paneer.

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 10 Produce Chhana

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 11 Produce Khoa

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance steps	Terminal Performance Objectives	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. Down heat slowly 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 or mixed milk and Iron karahi. **Task (What):** Prepare khoa in iron karahi using buffalo milk. **Standards (How well):** Soft, white & granular khoa produced from buffalo milk mixed.	➢ Concept 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, ladle, oven with control.
Safety: Observe personal safety.

Task Analysis

TASK NO: 12 Produce Yogurt/Dahi

Time: 12 hrs
Theory: 2 hrs
Practical: 10 hrs

Performance steps	Terminal Performance Objectives	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.

Module Code: M 1
Sub module Code: SM1.3
Sub module Title: Laboratory Tests

Description
This course is designed to equip the trainees with knowledge and skills on Laboratory Test require to be performed by this level. The course deals with various laboratory tests such as physical, chemical, and other tests as well as mother culture preparation needed for their occupation.

Instruction for trainer
The competencies are organized based on the principle of learning in each sub-module and level of their application. However, trainers are requested to deliver skills and technical knowledge of those specific competencies and to prepare trainees to practice these specific competencies before performing them as organized here either in accordance with the individual needs of the trainees or demanded by the competencies.

Competencies

1. Perform Organoleptic test.
2. Perform COB (Clot-on- boiling) test.
3. Perform Alcohol test.
4. Determine PH of milk & yoghurt.
5. Determine acidity of the milk /dahi
6. Determine fat % of milk by Gerber method.
7. Determine SNF (solid not fat) of the milk.
8. Determine fat content in yoghurt.
9. Determine fat content in Ice-cream.
10. Determine total solid of ice-cream.
11. Determine titratable acidity of ghee & butter.
12. Determine moisture content of butter &ghee.
13. Determine fat % in butter
14. Determine over-run of Ice cream.
15. Perform Soda test of milk.
16. Perform Sugar test of milk.
17. Perform salt test.
18. Perform Formalin test.
19. Perform Starch test.
20. Perform Urea test.
21. Perform Methylene Blue Reduction Test (MBRT)
22. Perform Standard Pate Count of milk
23. Perform Coliform test of milk
24. Prepare Yoghurt culture.

Task Analysis

TASK NO: 1 Perform Organoleptic test.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Open the lid of the container having milk. 4. Smell the milk & look the color and presence of foreign particles in the milk. 5. Take the sample from the container. 6. Put small quantity of milk into the mouth and fill the test and flavor.	**Condition(Given):** Milk, necessary equipment **Task (What):** Perform organoleptic test. **Standards (How well):** Freshness and hygienic condition of the milk judged.	➢ Concept of test ➢ Classification of test ➢ Concept of organoleptic test ➢ Natural smell, taste, color & flavor of the milk ➢ Judging techniques ➢ Difference between fresh and acidic milk ➢ Defects of milk ➢ Possible adulterant of milk ➢ Procedure of testing

Tools/equipment: Wooden / rubber hammer for opening the lead, plunger and sampling deeper.
Safety & Precaution: 1. The person responsible for test should not be suffering for cold.
2. Gurgle with clean water between judging each sample.

Task Analysis

TASK NO: 2 Perform COB (Clot-On- Boiling) test.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take sample from each container. 4. Take 5ml of milk into a test tube. 5. Hold the test tube in a clamp. 6. Heat the milk over the flame of the spirit lamp. 7. Drain the milk & observe any codling on the side of the test tube.	**Condition(Given):** Milk and boiling equipment **Task (What):** Perform COB (Clot-on-boiling) test. **Standards (How well):** Milk judged for its quality before reception by COB test.	➢ Concept of COB test ➢ Quality degradation of milk upon storage ➢ Fresh milk & colostrums ➢ Factor responsible for positive COB test ➢ Procedure of testing

Tools/equipment:. Test tube, 5 ml prepaid, sprit lamp, test tube holding lamp.
Safety: 1. wipe out loose water from the outer surface of test tube.
2. Keep the test tube opening away from face while heating.

Task Analysis

TASK NO: 3 Perform alcohol test.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take sample for each container. 4. Put 1 ml of milk into a test tube. 5. Put equal volume of prepared alcohol solution. 6. Mix well by inverting the test tube while closing the month of the test tube with thumb. 7. Observe for the curdling.	**Condition(Given):** Milk, heat stability and necessary equipment **Task (What):** Perform Alcohol test. **Standards (How well):** Milk tested for heat stability through alcohol test.	➢ Concept of alcohol test ➢ Quality of milk in various stages of lactation ➢ Co lustrum ➢ Difference between Cow milk & buffalo milk towards heat stability ➢ Dehydrated alcohol ➢ Alcohol solution preparation for testing ➢ Protein stability ➢ Interpretation of the result ➢ Procedure of testing

Tools/equipment: Test tube, 1 ml pipette.

Task Analysis

TASK NO: 4 Determine PH of milk & yoghurt.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 5 Determine acidity of the milk /Dahi/yoghurt

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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):** % 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 Analysis

TASK NO: 6 Determine fat % of milk by Gerber method.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Put the butyrometer in the seeking stand in up right position. 4. Put 10 ml of Gerber sulphuric with the help of tilt measure in butyrometer without touching the side of the butyrometer. 5. Put 10.75 ml of milk with milk prepaid. 6. Put 1 ml of amyl alcohol into the butyrometer. 7. Put some water to maintain the level. 8. Put luck stopper and shake well to dissolve the content. 9. Put into the centrifuge & rotate at 1100 RPM. 10. Read the result with the help of lock stopper key. 11. Open the lock stopper crook using lock stopper key. 12. Clean the butyrometer the warm water.	**Condition(Given):** Milk, sulpheric acid and well equipped lab **Task (What):** Determine fat % of milk by Gerber method. **Standards (How well):** Fat percent of milk determined by the Gerber method.	➢ Concept of fat test ➢ Principle of fat testing by Gerber method ➢ Testing the quality of acid & alcohol suitable for fat test ➢ Preparation of Gerber acid from commercial Sulpheric acid ➢ Specification of glassware & chemicals ➢ Procedure of testing

Tools/equipment: Electric / hands Gerber centrifuge, milk butyrometer, acid and alcohol tilt measure, butyrometer shaking stand, lock stopper, lock stopper key, milk prepaid.

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 Analysis

TASK NO: 7 Determine SNF (Solid Not Fat) of the milk.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take the homogeneous sample of the milk. 4. Adjust the temperature of the milk between 25 – 30 deg Celsius. 5. Pour the milk into the lactometer jar carefully not to incorporate air bubbles. 6. Dip the lactometer. 7. Note down the temperature of the milk. 8. Note down the lactometer reading. 9. Find out the CLR (Corrected lactometer Reading). 10. Calculate the SNF using standard fro meter. 11. Determine fat % of the milk.	**Condition(Given):** Sample of milk, STAR lacto meter & Gerber equipment **Task (What):** Determine CLR. Calculate SNF %. **Standards (How well):** Temperature & lactometer reading taken within the range of 0.5. SNF calculated.	➢ Concept of SNF test ➢ Specific gravity & density of milk ➢ Types of lactometers. ➢ Various for mules used for different lactometer ➢ Temperature correction factor ➢ Lactometer reading in relation with water adulteration ➢ Factors affecting lactometer reading ➢ Procedure of testing

Tools/equipment: ISI certified STAR Lactometer, lactometer jar, thermometer.
Safety:

Task Analysis

TASK NO: 8 Determine fat content in yoghurt.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 9 Determine fat content in Ice-cream.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 10 Determine total solid of ice-cream.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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).

Task Analysis

TASK NO: 11 Determine titratable acidity of ghee & butter.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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).

Task Analysis

TASK NO: 12 Determine moisture content of butter &ghee.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 13 Determine fat % in butter

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO. 14: Determine over-run of Ice cream.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 15 Perform Soda test of milk.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Draw about 5 ml milk sample in a clean test tube. 4. Add 5 ml dehydrated alcohol (95%) into it and mix well. 5. Add 2-3 drops of 1% rosalic acid solution into it. 6. Note the change of colour of milk.	**Condition(Given):** Raw milk, sodium bicarbonate as adulterant, tools and equipment **Task (What):** Perform Soda test of milk addition of sodium bicarbonate as adulterant using rosalic acid. **Standards (How well):** Pink colour obtained for the milk added with sodium bicarbonate.	➢ Concept of soda test ➢ Preparation of rosalic acid solution ➢ Color change obtained due to addition of rosalic acid ➢ Procedure of testing

Tools/equipment: Test tube, pipette.

Task Analysis

TASK NO: 16 Perform sugar test of milk.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 10 ml of milk sample in a test tube. 4. Add 1 ml conc. hydrochloric acid. 5. Add 100 mg (0.1 gm) resorcinol crystals. 6. Shake it vigorously and boil it for 10 minutes in boiling water on heater. 7. *Note the change of colour of milk sample.*	**Condition(Given):** Raw milk, sucrose as adulterant tools and equipment **Task (What):** Perform sugar test of milk. **Standards (How well):** Milk added with sugar showed red color	➢ Concept of sugar test ➢ Possibility of sugar adulteration in the milk received at collection centre/chilling centre. ➢ Procedure of testing

Tools/equipment: Test tube, Hot plate heater, Beaker.
Safety: Use Conc. Hydrochloric acid carefully.

Task Analysis

TASK NO: 17 Perform salt test.

Time: 8 hrs
Theory : 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 5 ml of 0.1N silver nitrate in a test tube. 4. Add 2 drops of 5% potassium chromate indicator. 5. Observe the colour of silver nitrate solution becomes as brick red. 6. Add 3 ml of milk. 7. Note the change of colour of milk.	**Condition(Given):** Raw milk , adulterant tools and equipment **Task (What):** Perform salt test. **Standards (How well):** Change of red color in yellow indicated milk having more than 0.14% chloride. Confirmed that milk was adulterated with common salt.	➢ Concept of salt test ➢ Possibility of normal milk showing positive test ➢ Possibility of salt adulteration in the milk received at collection centre/ chilling centre. ➢ Procedure of testing

Tools/equipment: Test tubes, pipettes.
Safety: Handle the chemical silver nitrate carefully.

Task Analysis

TASK NO: 18 Perform formalin test.

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 10 ml milk in a test tube. 4. Add 0.5 ml of 1% FeCl3 solution. 5. Add concentrated sulphuric acid so that it forms separate layer at the bottom without mixing with milk. 6. Note the change of colour.	**Condition(Given):** Formal dehyde, raw milk and necessary tools and equipment **Task (What):** Perform Formalin test. **Standards (How well):** Violet or blue color observed at the junction of two liquids indicated the presence of formalin. The test is sensitive to one part in 10,000.	➢ Concept of formalin test ➢ Preparation of chemical ➢ Possibility of using formalin as preservative in the milk received at collection centre/chilling centre ➢ Harmful effect of formalin on health ➢ Procedure of testing

Tools/equipment: Test tubes, pipettes.
Safety: Handle conc. sulphuric acid carefully.
Judge the change in colour carefully.

Task Analysis

TASK NO: 19 Perform starch test.

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take about 3 ml of milk sample in a clear test tube. 4. Boil the milk over flame and cool it. 5. Add 1-3 drops of 1% iodine solution mix well with sample. 6. Note the change of colour.	**Condition(Given):** Milk is adulterated with starch to increase the SNF level. Raw milk ,iodine solution and necessary tools and equipment **Task (What):** Perform Starch test. **Standards (How well):** Presence of blue color indicated the adulteration with starch.	➢ Concept of starch test ➢ Possibility of using starch as adulterant in the milk received at collection centre/chilling ➢ Preparation of chemical ➢ Procedure of testing

Tools/equipment: Test tube, heater or burner, pipettes.

Task Analysis

TASK NO: 20 Perform urea test.

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take 5 ml of milk in a 50 ml Erlenmeyer flask, add 5 ml sodium acetic acid buffer or TCA solution and heat for 3 minutes in boiling water bath using a stop watch (no heating is required in case of TCA being used). 4. Filter the ppt (Whatman No.42 filter or equivalent) and collect 1 ml of the filtrate in a test tube clean test tube. 5. Add 1 ml NaOH solution to the filtrate followed by 0.5 ml sodium hypochloride solution mix thoroughly and finally add 0.5 ml phenol solution.	**Condition(Given):** Urea is added in milk to increase the milk solid. Urea and milk sample **Task (What):** Determine the adulteration of Urea in the given sample. **Standards (How well):** Formation of characteristic blue or bluish green color indicated the presence of extraneous urea in the milk sample. Filtrate from unadulterated milk remained colorless. This test is capable of detecting as low as 0.1% urea in milk.	➢ Concept of urea test ➢ Possibility of using urea as adulterant in the milk received at collection/chilling centre ➢ Preparation of reagent. ➢ Procedure of testing

Tools/equipment:. Pipettes, test tubes, whatman filter paper, filter paper stand.

Task Analysis

TASK NO: 21 Perform Methylene Blue Reduction Test (MBRT)

Time: 10 hrs
Theory : 2 hrs
Practical: 8 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Mix the sample thoroughly and pour aseptically into a sterile reductase test tube to the 10 ml mark, wetting only one side of the tube. 4. Add 1 ml of methylene blue solution. 5. Close the test tube with a sterile rubber stopper and invert the tube gently twice to insure complete mixture. 6. Place the tube in the 37 deg Celsius water path. The level of the water in the bath should be slightly higher than the milk in the tube. If possible close the lid of the water bath to exclude light and note the time. 7. Set up a control tube consisting of 10 ml milk in a sterile reductase test tube with 1 ml of tap water. Place it in boiling water for 3 minutes, cool and place in the water bath. 8. Examine the tube after half an hour. The milk is regarded decolorized when the whole milk column is completely decolorized to within 5 mm of the surface. 9. Proceed test beyond for the half-hour period and tubes be examined for depolarization at half hourly intervals inverting the tubes where depolarization has not started.	**Condition(Given):** The given sample has to be tested for hygienic condition applying equipment **Task (What):** Perform Methylene Blue Reduction Test (MBRT) **Standards (How well):** Change of color from blue to white in less than 30 minutes indicated poor quality milk.	➢ Concept of MBRT ➢ Grading of milk using MBRT time ➢ Micro biological load & dye reduction time ➢ Procedure of testing

Tools/equipment: Water bath at 37 +- 1 deg Celsius, sterile reductase test tubes, sterile 1 ml pipettes and sterile rubber stoppers for the test tubes.

Safety & Precaution: Use only sterilized glass wears and stoppers.
Store the chemicals preferably in refrigerator.

Task Analysis

TASK NO: 22 Perform Standard Pate Count of milk

Time: 14 hrs
Theory : 2 hrs
Practical: 12 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take two sterile Petri dishes. 4. Transfer to each dish by means of a sterile pipette, 1 ml of the test sample, if liquid of 1 ml of the initial suspension in the case of other products. 5. Take two further sterile Petri dishes. 6. Transfer to each dish by means of another sterile pipette, 1 ml of the 10-1 dilution (liquid product) or 1 ml of the 10-2 dilution (other products). 7. Repeat this operation, if necessary, using further decimal dilutions. 8. Pour 12 ml to 15 ml of the culture medium into each Petri dish. 9. Mix carefully the prepared dishes and allow the mixture to solidify by leaving the Petri dishes to stand on a cool horizontal surface. 10. Invert the prepared dishes and place them in the incubator at 30+-1 deg Celsius for 72 +- 3h. 11. Count the colonies on the plates using the colony counting equipment.	**Condition(Given):** Milk sample bacterial load (live) using total plate count equipment **Task (What):** Perform Standard plate count **Standards (How well):** Growth of the colony in Petri dish Counted and recorded. Result expressed as number of colony per ml. of the sample.	➢ Concept of Standard Pate Count test ➢ Bacteriological load of raw and pasteurized milk ➢ Grading of milk on the basis of total bacterial load ➢ Type of bacteria present in milk ➢ Source of contamination ➢ Procedure of testing

Tools/equipment: Incubator (30+-1deg Celsius), Petri dishes (glass of 90 to 100 mm diameter), graduated pipettes (plugged with cotton wool, 1 ml, 10ml), water bath (45+-1 deg Celsius), colony counting equipments (mechanical or electric digital counter), PH meter, test tubes (20 ml capacity), bottles and flasks (150 to 250 ml capacity).

Safety: Always use sterilized glassware and equipment for sampling inoculation and propagation. Do not stack the dishes more than six high. Stacks of dishes should be separated from one another and from the walls and top of the incubator.

Task Analysis

TASK NO: 23 Perform coli form test of milk

Time: 14 hrs
Theory : 2 hrs
Practical: 12 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Mix the sample thoroughly and prepare 1 dilution following the "Dilution Technique A" for liquid samples and "Dilution Technique B" for solid samples. 4. Prepare two dishes from the liquid product and/or from each dilution chosen. 5. Transfer with sterile pipette 1 ml. of liquid product or the appropriate dilutions to the centre of each dish. Touch the tip of the pipette on to a dry area in the Petri dish. Use another sterile pipette to inoculate each dilution (10) into the dishes. 6. Inoculate a sterile Petri dish with 1 ml. sterile quarter strength Ringers solution and 15 ml. of the medium for checking its sterility as "control". 7. Pour about 15 ml. molten VBR agar at 45deg.Celsius to each inoculated Petri dish and mix well. Allow the agar to set and after complete solidification overlay another 5 ml. of the molten VBR agar onto the surface of the inoculated medium so as to restrict surface growth (or to maintain anaerobic condition for coli forms). Allow solidifying as described above. 8. Invert the prepared dishes and incubate the inoculated dishes and "control" in the incubator set at 30 deg. Celsius for 24 hours.	**Condition(Given):** Sample milk ,VBR agar equipment and necessary materials **Task (What):** Perform coli form test of milk **Standards (How well):** Growth of the colony in Petri dish Counted and recorded. Result expressed as number of colony per ml. of the sample.	➢ Concept of coli form test ➢ Growth of the colony in Petri dish ➢ Counted and recorded. ➢ Result expressed as number of colony per ml. of the sample ➢ Importance of coli form test in dairy industry ➢ Procedure of testing

Tools/equipment: Autoclave (121+- deg Celsius), oven for dry sterilization (170 to 175 deg Celsius for 1 h), Incubator (30+-1 deg Celsius), Petri dishes (90 to 100 mm diameter), pipettes (1 ml and 10 ml), water bath (45 +-1 deg Celsius), colony counting equipment (mechanical or electronic digital counter), pH meter, Bottles or flasks (for boiling and storage of culture media), test tubes (16 mm*160 mm), Durham's tubes (for use with the test tubes).

Task Analysis

TASK NO: 24 Prepare yoghurt culture.

Time: 10 hrs
Theory : 1 hrs
Practical: 9 hrs

Performance steps	Terminal Performance Objectives	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. Necessary tools, equipment and materials **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/Precaution: Avoid contamination.
Maintain personal hygiene.

Module Code: M 1
Sub module Code: SM 1.4
Sub module Title: Equipments Cleaning& Sanitization

Description

This course is designed to equip the trainees with knowledge and skills on Equipment Cleaning and sanitization require to be performed by this level. The course deals with cleaning in place of plant, cleaning and sanitization of pipe lines and equipment and glassware needed for their occupation.

Competencies

1. Perform CIP (Cleaning in place) of the plant
2. Clean & Sanitize Pipelines & equipments
3. Sanitize glassware & laboratory equipments

Task Analysis

TASK NO: 1 Perform CIP (Cleaning in place) of the plant.

Time: 10 hrs
Theory : 1 hrs
Practical: 9 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1.Receive instructions. 2.Collect necessary tools, equipment & materials. 3.Flush out the entire milk residue from the plant heat exchanger. 4.Pump the alkali solution for the CIP tank to the balance tank. 5.Heat to 85 deg. Celsius and circulate for 25 min. 6.Flush out the lye solution residue. 7.Pump in the acid solution for the CIP tank. 8.Heat to 85 deg Celsius and circulate for 20-25 min. 9.Flush out all the traces of acid with fresh water.	**Condition(Given):** Plate heat exchanger is to be cleaned by CIP method using acid 8 lye solutions. **Task (What):** Circulate lye solution. Circulate acid solution for CIP. **Standards (How well):** PHE cleaned by CIP using lye & acid solution.	➢ Concept of cleaning and sanitization ➢ Importance of cleaning of plant ➢ Chemicals used for CIP cleaning ➢ Strength of chemical, time & temperature required for cleaning different process equipments ➢ Testing the strength of chemicals ➢ Procedure

Tools/equipment: CIP tanks for acid , alkali & hot water.
Safety: Don't touch acid or alkali solution.

Task Analysis

TASK NO: 2 Clean & Sanitize Pipelines & equipments.

Time: 10 hrs
Theory : 1 hrs
Practical: 9 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Clean the equipment / pipelines using either CIP or manual. 4. Circulate hot water at 85 -90 deg Celsius for 5 minutes. 5. Circulate the Incase of chemical sanitizer chemical solution of desired strength for at least 1 minute. 6. Expose the surface with line steam incase of steam sanitizer for at least 5 min. 7. Drain the solution. 8. Leave the equipment for drying.	**Condition(Given):** Dairy equipment & pipelines have to be sanitized before product processing. **Task (What):** Clean & Sanitize Pipelines & equipments. **Standards (How well):** All the parts coming in contact with milk cleaned & sanitized.	➢ Importance of sanitization ➢ Different method of sanitization ➢ Sanitizing chemicals. ➢ Strength of sanitizing chemicals ➢ Procedure

Tools/equipment: No additional tools / equipment required.
Safety & Precaution: 1. Protect you for live steam & boiling water.
2. Never run un-pasteurized water to cool the equipment after sanitizing.

Task Analysis

TASK NO: 3 Sanitize glassware & laboratory equipments.

Time: 10 hrs
Theory : 1 hrs
Practical: 9 hrs

Performance steps	Terminal Performance Objectives	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 Code: M2

Module Title: Sweet Making

Description

This module is designed to equip trainees with the knowledge and skills on Sweet Making as a specific module. This course provides skills and knowledge on processing and production of milk based sweet items. This course especially, deals with desiccated milk based sweets, heat Acid coagulated products, cultured/fermented products and milk based puddings / desserts related to milk based sweet products.

Aim

This module aims to equip trainees with knowledge and skills on sweet making sweets, especially, processing and production of sweet items necessary to be a sweet maker

Objectives

After completion of this core module the trainees will be able to:

1. Prepare desiccated milk based sweets
2. Prepare heat acid coagulated products
3. Prepare cultured/fermented products
4. Prepare milk based puddings / desserts

Prerequisite: Basic module completed

Duration: 260 hours

Module Structure (M 2)

S.N.	Code	Sub-modules	Nature	Total hours	Full marks
1	SM 2.1	Desiccated Milk Based Sweets	T+P	260	200
2	SM 2.2	Heat Acid Coagulated Products	T+P		
3	SM 2.3	Cultured / Fermented Products	T+P		
4	SM 2.4	Milk based Puddings / Desserts	T+P		
Total				**260**	**200**

Module Code: M 2

Sub module Code: SM2.1

Sub module Title: Desiccated Milk Based Sweets

Description

This course is designed to equip the trainees with knowledge and skills on Desiccated Milk Based Sweets require to be performed by this level. The course deals with various sweets preparation and production skills needed for their occupation.

Instruction for trainer

The competencies are organized based on the principle of learning in each sub-module and level of their application. However, trainers are requested to deliver skills and technical knowledge of those specific competencies and to prepare trainees to practice these specific competencies before performing them as organized here either in accordance with the individual needs of the trainees or demanded by the competencies.

Competencies

1 Develop the concept of sweet
2 Prepare khoa
3 Prepare Gulab jamun
4 Prepare kala-jamun
5 Prepare pantua
6 Prepare lalmohan
7 Prepare burfi
8 Prepare kalakand
9 Prepare milk caké
10 Prepare peda
11 Prepare Rabri
12 Prepare kulfi

Task Analysis

TASK NO: 1 Develop the concept of sweets

Time: 2 hrs
Theory: 2 hrs
Practical: hrs

Performance steps	Terminal Performance Objectives	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 Analysis

TASK NO: 2 Prepare Khoa		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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 Analysis

TASK NO: 3 **Prepare Gulab-jamun**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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 Analysis

TASK NO: 4 **Prepare Kalajamun**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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, wooder plank.
Safety: 1. Protect you from hot oil.
2. Put the ball into the hot oil carefully.

Task Analysis

TASK NO: 5 **Prepare Pantuwa/Ledikeni**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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 Analysis

TASK NO: 6 **Prepare Lalmohan**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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 Analysis

TASK NO: 7 **Prepare Burfi**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 8 **Prepare Kalakand**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 9 **Prepare Milk Cake**	Time: 8 hrs Theory: 2 hrs Practical: 6 hrs

Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 10 **Prepare Peda**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 11 **Prepare Rabri.**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 12 **Prepare Kulfi.**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Module Code: M 2

Sub module Code: SM2.2

Sub module Title: Heat Acid Coagulated Products

Description

This course is designed to equip the trainees with knowledge and skills on Heat and Acid Coagulated Products require to be performed by this level. The course deals with various sweets preparation and production skills needed for their occupation.

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Competencies

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

Task Analysis

TASK NO: 1 **Produce Chhana**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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):** Milk heating vessel, plunger, muslin cloth, cow milk, citric acid. **Task (What):** Prepare Chhana from cow milk for sweet preparation. **Standards (How well):** Soft and smooth Chhana produced.	➢ Concept of heat acid coagulated products ➢ Types of product ➢ Introduction of chhana ➢ Difference 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 Analysis

TASK NO: 2 **Prepare Rasogolla (Rasabari).**		Time: 8 hrs Theory: 2 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.	**Condition(Given):** Milk heating vessel, plunger, karahi, ladder.,chhana,wheat flour,sugar. **Task (What):** Prepare the Chhana balls. Cook the balls & stabilize & store. **Standards (How well):** 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.

Task Analysis

TASK NO: 3 **Prepare Rasomalai**		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 4 **Prepare Rajbhog**

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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,

Task Analysis

TASK NO: 5 **Prepare Kheer mohan**		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 6 Prepare Sandesh.		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 7 Prepare Chhana - murki		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 8 Prepare Cham-cham.		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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.

Task Analysis

TASK NO: 9 Prepare Sita bhog.		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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

Task Analysis

TASK NO: 10 Prepare Chhana Gaja.		Time: 7 hrs Theory: 1 hrs Practical: 6 hrs
Performance steps	**Terminal Performance Objectives**	**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

Task Analysis

TASK NO: 11 Prepare Chhana kheer.

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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

Task Analysis

TASK NO: 12 Prepare Chhana Pakora.

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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

Module Code: M 2

Sub module Code: SM2.3

Sub module Title: Cultured / Fermented Products

Description

This course is designed to equip the trainees with knowledge and skills on Cultured/Fermented Sweets Products require to be performed by this level. The course deals with various sweets preparation and production skills needed for their occupation.

Competencies

1. Prepare Mishti doi
2. Prepare Shrikhand (sikarni)
3. Prepare Lassi
4. Prepare Kadhi
5. Prepare Raita
6. Prepare Dahi vada

Task Analysis

TASK NO: 1 **Prepare Misti Doi**

Time: 8 hrs
Theory: 1 hrs
Practical: 7 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

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

Time: 8 hrs
Theory: 1 hrs
Practical: 7 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 3 Prepare Lassi by factory method.

Time: 8 hrs
Theory: 1 hrs
Practical: 7 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Receive instructions. 2. Collect necessary tools, equipment & materials. 3. Take milk with 1.5-3.8% fat & 9% SNF. 4. Add 0.5% sodium di-hydrogen phosphate. 5. Heat to 90 deg Celsius for 15 min. 6. Homogenize at 150 kg/cm2 9 (first stage) & 50 kg/cm2 (second stage) at 60 deg Celsius & cool to 31 deg Celsius. 7. Add lactic culture @ 1% of milk. 8. Allow to set for 16 hrs to pH 4%. 9. Break the curd by agitating for a minute. 10. Add 0.5% low methoxy pectin. 11. Prepare 25% sugar solution separately pasteurize & strain. 12. Add sugar syrup to the mix dahi so as to have 12% sugar concentration in lassi. 13. Add rose water/kewra flavour @ 1 ml per 5 ml of lassi. 14. Pass through homognizer. 15. Fill in pouches & store in cold store.	**Condition(Given):** Batch pasteurizer, humanizer, pouch filling machine, milk, dahi, dahi, sugar, colouring & flavouring ingredients. **Task (What):** Prepare Lassi by factory method **Standards (How well):** Lassi having white to creamy white viscous liquid with a sweetish, rich aroma & milk taste prepared & packed in pouches.	➢ Introduction of lassi ➢ Method of preparation ➢ Lactic acid culture ➢ Pasteurization ➢ Homogenization ➢ pH measurement ➢ Characteristics taste of lassi ➢ Packaging of lassi. ➢ Shelf life & storage condition ➢ Procedure

Tools/equipment: Batch pasteurizer, humanizer, pouch filling machine.

Task Analysis

TASK NO: 4 Prepare Kadhi by traditional method.

Time: 8 hrs
Theory: 1 hrs
Practical: 7 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 5 **Prepare Raita.**

Time: 8 hrs
Theory: 2 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 6 **Prepare Dahi vada.**

Time: 8 hrs
Theory: 1 hrs
Practical: 7 hrs

Performance steps	Terminal Performance Objectives	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.

Module Code: M 2

Sub module Code: SM2.4

Sub module Title: Milk based Puddings / Desserts

Description

This course is designed to equip the trainees with knowledge and skills on Milk Based Puddings/Desserts require to be performed by this level. The course deals with various sweets preparation and production skills needed for their occupation.

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Competencies

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

Task Analysis

TASK NO: 1 **Prepare Kheer.**

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

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

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 3 Prepare Gajar-ka-halwa.

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 4 **Prepare Sohan Halwa.**

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Task Analysis

TASK NO: 5 **Prepare Kaju Burfi.**

Time: 7 hrs
Theory: 1 hrs
Practical: 6 hrs

Performance steps	Terminal Performance Objectives	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.

Module Code: M3

Module Title: Entrepreneurship Development

Description

This module is designed to equip trainees with the knowledge and skills on Entrepreneurship Development as a common module. This course provides skills and knowledge on generic skill, Entrepreneurship skills, sales and marketing and basic accounting and presentation of products as sub modules.

Aim

This module aims to equip trainees with knowledge and skills on dairy Science and Technology necessary to be a dairy JTA.

Objectives

After completion of this core module the trainees will be able to:

1. Develop generic skill on related occupation.
2. Acquire entrepreneur skills to be an entrepreneur
3. Promote sales and marketing skills
4. Develop accounting and product presentation skill

Prerequisite: Specific module completed.

Duration: 130 hours

Module Structure (M 3)

S.N.	Code	Sub-modules	Nature	Total hours	Full marks
1	SM 3.1	Generic Skill	T+P	40	100
2	SM 3.2	Entrepreneur Skill	T+P	40	
3	SM 3.3	Sales and Marketing	T+P	20	
4	SM 3.4	Basic Accounting and Presentation of Products	T+P	30	
Total				**130**	**100**

Module Code: M 3

Sub module Code: SM 3.1

Sub module Title: Generic Skills

Description

This module is designed to equip trainees with the knowledge and skills on Generic Skills as a prerequisite course for mastering any specific module/s. The course deals with the life skills needed to survive and adopt any change situation. Similarly, the trainees can cope with the existing environment and technology related to their occupation. ***The focus of this package is to develop trainees to maintain personal hygiene, develop personality, enrich with marketing skills, and orient towards self-employment. Similarly, the trainees are to be prepared and educated for about worker traits and occupational code of conducts.***

Competencies

1. Explain the importance of self awareness.
2. Orient with personal safety precaution/ hygiene
3. Write application for leave, visa, citizenship etc.
4. Read, notice, vacancy advertisement etc.
5. Keep records of materials, inventory.
6. Study prevailing rules, regulation, bye laws work ethics.
7. Develop bio-data.
8. Develop interpersonal skill with family, friends and members of organization
9. Make effective decision.
10. Solve simple problems.
11. Set personal goal for yourself.
12. Treat others the way you want to be treated.
13. Explain the process of airport proceedings.

Task Analysis

Task No: 1 Explain the importance of self awareness.

Time: 1 hr.
Theory: 1 hr.
Practical: hrs.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Define self awareness. 3. Discuss importance of self awareness. 4. Enlist zest of discussion.	**Condition(Given):** Reading materials **Task (What):** Explain the importance of self awareness. **Standard (How well):** Importance of self awareness explained.	➢ Definition of awareness ➢ Importance self awareness

Tools/equipment:

Safety:

Task Analysis

Task No: 2 Orient with personal safety precaution/hygiene.

Time: 2 hrs
Theory: 1 hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Define safety precaution/personal hygiene. 3. Enlist importance of safety precaution/personal hygiene. 4. Enlist the things that should be considered while following of safety precaution/personal hygiene. 5. Collect information on hazards that may occur in their working condition.	**Condition(Given):** People Working in workshop **Task (What):** Orient with personal safety precaution/ hygiene. **Standard (How well):** All the steps followed in sequence.	➢ Definition of Personal hygiene and safety precaution ➢ Importance of safety precaution and personal hygiene ➢ Thing that we should consider during the personal hygiene and safety precautions

Tools/equipment:

Safety:

Task Analysis

Task No: 3 Write applications for leave, visa, citizenship etc.

Time: 2 hrs
Theory: 1 hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Select one situation which requires application. 2. Take A4 size paper. 3. write application (make sure all components of an application are considered) 4. Make sure that main body agrees with the given situation. 5. Submit to the concerned body.	**Condition(Given):** Different simulation situations which requires application **Task (What):** Write application for leave, visa, citizenship etc. **Standard (How well):** Application is in A4 format written. The task steps followed in sequence.	➢ Definition of application ➢ Reasons for writing application ➢ Different conditions for writing application (for visa, citizenship, leave etc) ➢ Format for application ➢ Main components of application

Tools/equipment:

Safety:

Task Analysis

Task No: 4 Read notice, vacancy advertisement.

Time: 2 hrs
Theory: 1 hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect different types of news paper. 2. Select general notice and vacancy advertisement. 3. Read notice and vacancy advertisement. 4. Explain the general contents of notice and vacancy advertisement.	**Condition(Given):** Tender documents, notices, vacancy advertisements and different newspapers. **Task (What):** Read notice, vacancy advertisement etc. **Standard (How well):** Notice and vacancy advertisement read and interpreted.	➢ Definition of tender document, notice, advertisement ➢ Importance of tender documents, notice and vacancy advertisement

Tools/equipment:

Safety:

Task Analysis

Task No: 5 Keep records of materials, inventory.

Time: 2 hrs
Theory: 1hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect list of different materials. 2. Register purchase quantity, issued quantity, damage, wear and tear quantity etc. 3. Calculate remaining quantity of different materials. 4. Verify the quantity with the stock quantity in the store. 5. Keep records.	**Condition(Given):** List of different materials (Purchase quantity, issued quantity, damage, wear and tear quantity etc) **Task (What):** Keep records of materials, inventory. **Standard (How well):** All the steps followed in sequence.	➢ Definition of Inventory ➢ Process for keeping inventory ➢ Inventory forms and formats

Tools/equipment:

Safety:

Task Analysis

Task No: 6 Study prevailing rules, regulation, bye laws, work ethics.

Time: 2 hrs
Theory: 2 hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect bye laws, rules regulation documents, code of conduct etc. 2. Study the documents. 3. List the main rules and regulation. 4. Keep records.	**Condition(Given):** Prevailing rules, regulations, bye laws, code of conduct **Task (What):** Study prevailing rules, regulation, by laws work ethics **Standard (How well):** Important points of rules and regulations, bye laws listed out.	➢ Definition of laws, rules and regulations, bye laws, code of conduct and work ethics ➢ Importance of bye laws, code of conduct and work ethics

Tools/equipment:

Safety:

Task Analysis

Task No: 7 Develop bio-data.

Time: 2 hrs
Theory: 1 hr.
Practical: 1 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Collect detail information of the person. 2. Keep the information into different headings. 3. Develop bio-data in A4 size paper. 4. Make sure no information is missed. 5. Sign the bio-data 6. Keep records.	**Condition(Given):** Detail information of the person **Task (What):** Develop bio-data. **Standard (How well):** Bio-data is in A4 format with following contents • Full Name • Permanent Address • Date of birth • Educational Qualification • Experience • Language • Signature developed.	➢ Definition Bio-data ➢ Points, that should be considered in bio-data ➢ Advantages of bio data ➢ Procedure for reorganizing information in bio-data

Tools/equipment:

Safety:

Task Analysis

Task No: 8 Develop interpersonal skill with family, friends and members of organization.

Time: 3 hrs
Theory: 1 hr.
Practical: 2 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Select the people with different behavior. 3. Provide role for each person. 4. Discuss on the given topic. 5. Note down the words used for developing good relationships between them 6. End the discussion. 7. Enlist the interpersonal relationship of each person.	**Condition(Given):** Different people with different behavior **Task (What):** Develop interpersonal skill with family, friends and members of organization. **Standard (How well):** Interpersonal skill with family, friends and members of organization developed.	➢ Definition of good relationship ➢ Relationship with your family, friends and members of your organization ➢ Advantages of Good relationship ➢ Tips for making good relationship

Tools/equipment:

Safety:

Task Analysis

Task No: 9 Make effective decision.

Time: 7 hrs
Theory: 1 hr.
Practical: 5 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. State the issue. 3. Conduct discussion on the issue for 5-10 minutes. 4. Note the pros and cons of the issue raised in the discussion. 5. Make decision using win -win strategy 6. Disseminate the decisions.	**Condition(Given):** Simulated debatable issues **Task (What):** Make effective decision. **Standard (How well):** Decision made on the win/win strategy.	➢ Definition of decision ➢ Situations and circumstances for effective decision ➢ Advantages of effective decision ➢ Process for making decision

Tools/equipment:

Safety:

Task Analysis

Task No: 10 Solve simple problem.

Time: 7 hrs
Theory: 1 hr.
Practical: 5 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Select the person with simple problem. 3. Orient with the problem. 4. Find different alternatives of solutions. 5. List merits and demerits of each solution. 6. Select the best solution. 7. Implement the solution. 8. Receive the feedback.	**Condition(Given):** Person with a simple problem related to the life **Task (What):** Solve simple problem. **Standard (How well):** Alternatives of solutions identified. Person satisfied with the solutions.	➢ Definition of problem ➢ Types of problem ➢ Problem solving process ➢ Different types of solutions ➢ Merits and demerits of each alternative solutions ➢ Win/win strategy ➢ Principles of persuasion

Tools/equipment:

Safety:

Task Analysis

Task No: 11 Set personal goal for you .

Time: 7 hrs
Theory: 2 hr.
Practical: 5 hrs.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Set clear vision of future. 3. Internalized the set goal. 4. Check if the goal is simple, clear and achievable. 5. List the strategies to achieve the goal.	**Condition(Given):** Person with clear vision of his future **Task (What):** Set personal goal for yourself. **Standard (How well):** Simple, clear and achievable goal set.	➢ Getting to know yourself ➢ Accepting yourself ➢ Setting personal goal for yourself ➢ Working/strategies to achieve the goal

Tools/equipment:

Safety:

Task Analysis

Task No: 12 Treat others the way you want to be treated.

Time: 6 hrs
Theory: 1 hr.
Practical: 5 hr.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Receive instruction. 2. Prepare two persons. 3. Select the conversation topic. 4. Make them conversation on the topic for about 5 to 10 minutes. 5. Note if the person was happy with the way he was treated. 6. Change the role.	**Condition(Given):** Two persons **Task (What):** Treat others the way you want to be treated. **Standard (How well):** The person happy with the way he treated.	➢ Relation with family and friends ➢ Good and bad ways to treat others. ➢ Procedure for treating others

Tools/equipment:

Safety:

Task Analysis

Task No: 13 Explain the process of airport proceedings.

Time: 5 hrs
Theory: 1 hr.
Practical: 4 hrs.

Performance steps	Terminal Performance Objective	Related Technical Knowledge
1. Prepare for departure/arrival. 2. Make sure the carries required documents (passport and ticket) 3. Check the baggage for security. 4. Confirm the departure time looking at the information board or TV. 5. Pay the airport tax. 6. Register the ticket and baggage 7. Collect the tags of the baggage. 8. Collect boarding pass. 9. Pass through security check. 10. Proceed to the plane. 11. Register name on the immigration of destination country. 12. Arrange the transport to reach work station.	**Condition(Given):** Simulated situation for departure / arrival **Task (What):** Explain the process of airport proceedings. **Standard (How well):** All the steps followed in sequence.	➢ Airport for visiting different countries ➢ Arrival and Departure ➢ Procedure for departure and arrival ➢ Registration ➢ Airport tax ➢ Boarding pass ➢ Lost and findings ➢ Baggage collection ➢ Immigration ➢ Security check

Tools/equipment:

Safety: Always receives passport from the points where it could be checked.

Module Code: M 3

Sub Module Code: SM 3.2

Sub module Title: Entrepreneur Skills

Description

This course is designed to equip the trainees with knowledge and skills on Entrepreneur skill. The course deals with various entrepreneur competencies, project identification, enterprise management, marketing skills, promotional activities, and business scheme preparation and communication skills needed for the occupation.

Competencies

1. Develop entrepreneurial competencies.
2. Select / identify a project.
3. Prepare a business scheme.
4. Develop marketing skill.
5. Conduct promotional activities.
6. Apply communication skills.
7. Manage an enterprise.

Task Analysis

Task No: 1 Develop entrepreneurial competencies.

Time: 3hrs
Theory: 1 hr.
Practical: 2 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Observe the surrounding environment and entrepreneur own capabilities. 2. Develop entrepreneur own capabilities. 3. Take steps for achievement of - economic objective. - social objective. - human objective. 4. Prepare business plans based on ones own findings. 5. Develop new profitable business opportunities by combining resources in a new way. 6. Produce marketable products. 7. Create markets. 8. Innovate and develop improved technologies. 9. Inspire others. 10. Supply quality goods. 11. Reduce cost for reducing price of product. 12. Provide employment. 13. Utilize the scarce resource properly. 14. Avoid social nuisances. 15. Manage financial problem. 16. Develop management skill for all business activities - production, inventory, purchasing, marketing, research and development, financial and personnel. 17. Satisfy employees / consumers / partners. 18. Be dynamic, risk taking according to the situation. 19. Be perfect decision maker. 20. Develop confidence.	**Condition(Given):** Classroom and reading materials **Task (What):** Develop entrepreneurial competencies. **Standard (How well):** All the steps followed in sequence. Entrepreneurial competencies well developed	➢ Introduction to Entrepreneurship ➢ Traits of an entrepreneur ➢ Concept of employment ➢ Concept of business ➢ Entrepreneurial competencies ➢ Managerial skill

Tools/equipment:

Safety:

Task Analysis

Task No: 2 Select / identify a project.

Time: 4 hrs
Theory: 1 hr.
Practical: 3 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Make list of projects. 2. Classify the projects in group according to - personal interest / ability. - possibility of earning profit. - less risk. - knowledge and skill needed. - estimated size and available resources. - prevailing level of competition. - chance of expansion in future. - level of competition. - rising trend of future demand. - duration. 3. Investigate the projects. 4. Determine - form of business. - provision of capital. - location. - available staffs according to the project. - office equipment. - government policy. 5. Prioritize the projects regarding - strength, weakness, opportunity, threat. 6. Select right project according to your vision and mission.	**Condition(Given):** Site and reading materials **Task (What):** Select / identify a project. **Standard (How well):** All the steps followed in sequence. A project selected and identified meeting the requirements.	➢ Concept of business ➢ Introduction to SWOT (Strength, weakness, opportunity and threat) ➢ Tips for opportunity selection ➢ Reason of business failure ➢ Requisites of business success ➢ Project selection criteria

Tools/equipment:

Safety:

Task Analysis

Task No: 3 Prepare a business scheme.

Time: 7 hrs
Theory: 2 hr.
Practical: 5 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Identify the project standard regarding - functional. - technical. - aesthetic. - capital cost. - life cycle cost. 2. Specify the objective of the project. 3. Analyze net working by critical path method - state the master activities of the project. - evaluate whole activities. - set up the sequence of activities. - allocate the time / duration for each activity. - study about the cost of activities (labour / material / tools cost). - Prepare tabulation (sequence activities with time). - apply project evaluation and review technique. 4. Analyze production - prepare resource and multi project schedule. - state required men, machine, and materials for each production activities. - give specification of resources. - determine time schedule for each activities. 5. Analyze finance - by undiscounted method ▪ calculate simple rate of return on investment. ▪ calculate payback period. - by discounted method ▪ calculate net present value. ▪ internal rate of return. ▪ benefit cost ratio. 6. Develop financial plan - indicate funds need by form for the specified period. - indicate timing of inflows and outflows. - indicate sources. - indicate use of funds for project activities. - forecast to determine the specific amounts and timing of expenditure and receipts. - follow the profit and loss account.	**Condition(Given):** Reading materials and field visit report **Task (What):** Prepare a business scheme. **Standard (How well):** All the steps followed in sequence. Business scheme prepared according to the guidelines.	➢ Concept and importance of business plan / scheme ➢ Guideline for preparing a business plan ➢ Production planning ➢ Expenses ➢ Financial analysis ➢ Profit and loss account

Task Analysis

Task No: 4 Develop marketing skills.

Time: 4 hrs
Theory: 2 hrs.
Practical: 2hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Set the objectives to be achieved. 2. Analyze the market to increase sales volume. 3. Formulate the sales budget. 4. Evaluate the potential customer's needs and wants. 5. Determine marketing plans, procedures and policies to serve the customers demand. 6. Interlink demand with supply. 7. Co-ordinate between the different constituent elements of the marketing mix - product. - price. - place. - promotion. 8. Select effective marketing channel. 9. Develop effective and smooth marketing communication. 10. Apply market research. 11. Co-ordinate and control all marketing activities. 12. Evaluate performance of sales force periodically. 13. Review all plans and policies and change if necessary. 14. Motivate the employees properly. 15. Plan and develop product to match - demand of the customer. - product life cycle. 16. Observe and study buyer's behaviors and their grievances. 17. Select effective distribution channels.	**Condition(Given):** Products, market, customer and reading materials **Task (What):** Develop marketing skill. **Standard (How well):** All the steps followed in sequence. Marketing skills well developed.	➢ Introduction to market and marketing ➢ Concept on demand and supply ➢ Types of market (on the basis of region) ➢ Introduction to marketing mix ➢ Introduction to product life cycle ➢ Buyers' behavior and its characteristics

Tools/equipment:

Safety:

Task Analysis

Task No: 5 Conduct promotional activities.

Time: 4 hrs
Theory: 2 hr.
Practical: 2 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Select promotion mix as advertising according to - promotion objectives. - nature of the product. - nature of the target market. - stage of product life cycle. - size of the promotion budget. - promotion strategy. 2. Identify target audience. 3. Select objective regarding - informative. - persuasive. - reminding. - reinforcing. 4. Make decision for the budget. 5. Choose the message. 6. Liaison with the advertising agency. 7. Supervise advertising and marketing research. 8. Select the media - print media. - visual media. - audio media. - audio visual media. 9. Keep in touch with representatives of important media. 10. Cooperate with the sales and other departments. 11. Distribute advertising material. 12. Administration. 13. Evaluate impact	**Condition(Given):** Products, market, customers, and reading materials **Task (What):** Conduct promotional activities. **Standard (How well):** All the steps followed in sequence. Promotional activities conducted	➢ Concept of promotion ➢ Communication model ➢ Concept of advertisement ➢ Purpose of advertising ➢ Advertising media ➢ Features of advertising

Tools/equipment:

Safety:

Task Analysis

Task No: 6 Apply communication skills.

Time: 4 hrs
Theory: 2 hrs.
Practical: 2 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Determine the receiver to whom to communicate. 2. Specify the objective of communication. 3. Select appropriate channel of 4. Communication (downward, upward, broadcast horizontal, grape-vine and committee). 5. Solve the barriers in communication. 6. Design the contents according to the receiver - role of receiver. - history leading to communication. 7. Apply suitable method of communication. 8. Apply suitable language. 9. Listen and understand the feelings of receiver. 10. Clarify the communication. 11. Apply appropriate media	**Condition(Given):** Enterprises and communication media **Task (What):** Apply communication skills. **Standard (How well):** All the steps followed in sequence. Communication skills well applied.	➢ Concept and importance of communication ➢ Elements of communication ➢ Types of communication (oral and written, formal and informal, upward, downward and horizontal) ➢ Barriers to communication ➢ Means of communication ➢ Listening technique ➢ Communication process

Tools/equipment:

Safety:

Task Analysis

Task No: 7 Manage an enterprise.

Time: 4 hrs
Theory: 2 hr.
Practical: 2 hrs.

Performance Steps	Terminal Performance Objectives	Related Technical Knowledge
1. Establish and regulate industry / business by - selection of business / business form. - investigation and research. - select location, office equipment. - manage capital. - study of legal formalities. 2. Follow all management process to achieve goal of an enterprise. 3. Apply planning process - determine the objectives. - formulate policies, procedure, programs, strategies and standard. - develop scheduling. - develop budgeting. 4. Apply organizing process - division of work. - placement of personnel into jobs. - establishing relationships. - delegation and decentralization of authority. 5. Apply staffing process - determine manpower requirements. - recruit, select, and train the personnel. - promote and transfer the personnel. 6. Co-ordinate in efficient organization of work within a team by - leading. - communicating. - motivating. 7. Apply horizontal, vertical, external internal, diagonal co-ordination. 8. Apply controlling process - establish standard of performance for office work. - measurement of actual performance. - compare actual performance with standard.	**Condition(Given):** Enterprises and reading materials **Task (What):** Manage an enterprise. **Standard (How well):** All the steps followed in sequence. Enterprises well managed	➢ Establishment and regulation of business / industry ➢ Concept of management ➢ Role of management ➢ Managerial functions (planning, organizing, co-ordination and controlling) ➢ Method of planning ➢ Co-ordination in operating business

Tools/equipment:

Safety:

Module Code: M 3

Sub Module Code: SM 3.3

Sub module Title: Sales and Marketing

Description

This course is designed to equip the trainees with knowledge and skills on sales and marketing skills related occupation to the occupation. This course deals with market identification, demand determination, market network, product deliberation, and monitoring.

Competencies

1. Identify the market & determined the demand.
2. Develop market network and advertise the product.
3. Deliver & monitor the product in the market.
4. Improve product quality & service in the market.

Task Analysis

TASK NO: 1 Identify the market & determined the demand.

Time: 5 hrs
Theory: 2 .hrs
Practical: 3 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Recruit the marketing personnel. 2. Conduct the survey of potential market. 3. Collect the information of sale of the similar products. 4. Analyze the report. 5. Develop the marketing strategy. 6. Determine the size of the market. 7. Identify the possible area of the market. 8. Discuss with cheap executive & production department. 9. Prepare sale target.	**Condition(Given):** Potential market is to identify and demand projected. **Task (What):** Identify the market & determined the demand. **Standards (How well):** Best possible area for marketing identified. Achievable sales target fixed.	➢ Marketing Survey. ➢ Competitors in the market and their strength. ➢ Strength and weakness of the product. ➢ Production capability of the factory.

Tools/equipment:

Safety:

Task Analysis

TASK NO: 2 Develop market network and advertise the product.

Time: 5 hrs
Theory: 2 .hrs
Practical: 3 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Prepare company marketing plan 2. Select the distributor, dealer and retailer. 3. Select advertising agency. 4. Discuss and prepare advertisement plan. 5. Prepare advertisement materials focusing strength of your product over competitors. 6. Advertise the product before actual lunching. 7. Access the demand created due to advertisement. 8. Launch the product.	**Condition(Given):** Marketing network has to be establishing before actual lunching. An effective advertisement is to be selected carefully. **Task (What):** Develop market network and advertise the product. **Standards (How well):** Marketing Network established for major potential areas. Product advertised for creating demand & establishing brand in the market.	➢ Different ways of marketing. ➢ Dealer and Retailer appointment procedure. ➢ Potential market areas. ➢ Company decision on selling commission. ➢ Company marketing plan. ➢ Advertising agencies.

Tools/equipment:

Safety:

Task Analysis

TASK NO: 3 Deliver & monitor the product in the market.

Time: 5 hrs
Theory: 2 .hrs
Practical: 3 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Get the demand of each product for the market. 2. Get the vehicles or transport Lorries cleaned. 3. Check the quality of the product before loading for dispatch. 4. Prepare the dispatch slip. 5. Load the product in the vehicle, lorry in a hygienic & safe packaging. 6. Deliver the product as per the demand. 7. While delivery, check the condition of product storage & quality of the product in the dealer's (retailer shop). 8. Instruct the shop keeper & take the degraded product back. If products are not kept well	**Condition(Given):** Product has to be delivered & quality & demand are to be monitored. **Task (What):** Deliver the products in the market as per demand. Monitor the quality of the product in the market. **Standards (How well):** Products delivered in hygienic & safe condition. Market monitored for product quality & demand.	➢ Marketing network. ➢ Causes of product spoilage during transportation & storage. ➢ Quality characteristic of the products.

Tools/equipment:

Safety:

Task Analysis

TASK NO: 4 Improve product quality & service in the market.

Time: 5 hrs
Theory: 2 .hrs
Practical: 3 hrs

Performance steps	Terminal Performance Objectives	Related Technical Knowledge
1. Get information regarding your product quality compare to competitor for the market. 2. Monitor the selling out let for string & maintaining the quality. 3. Inform production department & managing director regarding the complaints of the quality of the product. 4. Obtain information regarding delivery & service from the consumer & sellers. 5. Take the correction measures accordingly.	**Condition(Given):** Product & service quality have to be monitored & improve continuously. **Task (What):** Let the complaint regarding service & quality. Take corrective measure in relation with other dept. **Standards (How well):** Consumer's sellers' complaints entertained. Quality of product & service improved.	➢ Your competitors. ➢ Your marketing network. ➢ Weakness & strength of your products. ➢ Quality maintenance in the market.

Tools/equipment:

Safety:

Module Code: M 3

Sub Module Code: SM 3.4

Sub module Title: Basic Accounting and Presentation of Skill

Description

This is designed to equip trainees with knowledge and skills in Accounting as well as presentation of skills in order to be an entrepreneur or for the promotion of professional career. This course deals with ledger preparation, progress report preparation, plan for costing and budgeting, tariffs calculation as well as loss and profit calculation.

Competencies

1 Prepare ledger book/computer
2 Maintain income and expenditures
3 Prepare progress reports
4 Control internal accounts
5 Respond to written correspondences
6 Complete all process as scheduled
7 Plan for costing and budgeting
8 Calculate tariffs
10 Calculate loss/profit in dairy transaction
11 Prepare the milk payment format

Task Analysis

Task No: **1 Prepare ledger book/computer**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Prepare & identify supporting documents 2. Prepare Journal 3. Get Approval 4. Maintain Ledger	**Condition(Given):** Class room with required materials & tools **Task (What):** Prepare ledger book/computer **Standard (How well):** Prepared ledger book/computer	➢ Accounting ▪ Definition ▪ Types ➢ Book Keeping ▪ Introduction ▪ Types ➢ Accounting procedure and system ➢ Accounting format & books ▪ Journal ▪ Bank/cash book ▪ Personal ledger ▪ Customer Ledger ▪ Bill ➢ Cash Receipt

Required tools/equipment: Calculator, Computer Journal

Tools and Materials:

- Bank/cash book
- Personal ledger
- Customer Ledger
- Bill
- Cash Receipt

Safety: Good Eye Sight

Task Analysis

Task No: **2 Maintain income and expenditures**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Collect bills with bill card 2. Write / compute receipt against bill 3. Receive cash from the customer 4. Return bill with receipt and bill card 5. Maintain Journal and computer ledger 6. Get bill from the store with necessary document such as accepted requisition form, purchase order and deposit report 7. Prepare Journal 8. Prepare check	**Condition(Given):** Class room with required materials & tools **Task (What):** Maintain income and expenditures **Standard (How well):** Maintained income and expenditures properly	➢ Concept of Income & Expenditure ➢ Identification of source of income ➢ Bill ▪ Definition ▪ Types ▪ Function ▪ Importance ▪ Billing Procedure ➢ Identification of bill ➢ Rebate / discount system ➢ Rebate / discount time ➢ Late fees ➢ Time and Percent of Late fees ➢ Purchasing procedure ➢ Different types of forms requisition form, purchase order, deposit report and Journal ➢ Process of book Keeping

Required tools/equipment:.
Tools and Materials: pen, pencils, eraser, requisition form, purchase order, deposit report and Journal, check, Bills, Receipt, Ledger
Equipments: Computer, OHP
Safety: *

Task Analysis

Task No: **3 Prepare progress reports**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Prepare statement of customer account 2. Prepare Trail balance 3. Prepare income & Expenditure statement 4. Reconcile bank account	**Condition(Given):** Class room with required materials & tools **Task (What):** Prepare progress reports **Standard (How well):** Prepared progress reports	➢ Reporting format ➢ Definition of customer account ➢ Concept of income & expenditure account ➢ Bank reconciliation statement ➢ Report writing technique

Required tools/equipment/materials:
Tools and Materials: pen, pencils, eraser, customer account book, letter pad, cash book
Equipments: Computer, OHP
Safety:

Task Analysis

Task No: **4 Controlled internal account**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Identify the cost centers 2. Identify functional relation with other staff 3. Supervise others work related to billing and accounting 4. Solve billing and accounting problems 5. Communicate information to other staff 6. Submit report to the manager regularly	**Condition(Given):** Class room with required materials & tools **Task (What):** Control internal account **Standard (How well):** Controlled internal account	➢ Concept and Type of cost centers ➢ Definition of internal control system ➢ Functional relationship ➢ Problem solving technique ➢ Communication ▪ Definition ▪ Types (Oral, Written, symbolic, Upward, downward, vertical and Horizontal) ▪ Skill ▪ Procedure ➢ Definition of Supervision and monitoring ➢ Supervision and monitoring technique

Required tools/equipment/materials:

Tools and Materials: pen, pencils, eraser, calculator, telephone, Job description sheet
Equipments: Computer, OHP
Safety:

Task Analysis

Task No: **5 Respond to written correspondences**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Collect written correspondents 2. Read written correspondents 3. Be inform with this written correspondents 4. Verify information 5. Respond Orally 6. Respond in writing	**Condition(Given):** Class room with required materials & tools **Task (What):** Respond to written correspondences **Standard (How well):** Responded to written correspondences in proper way	➢ Stakeholders ▪ Definition ▪ Types ▪ Relation with office ➢ Information / communication ▪ Definition ▪ Types ▪ Process ➢ Information analysis ➢ Orally responding procedure ➢ Orally responding skill ➢ Letter writing Skill ➢ Letter writing procedure

Required tools/equipment/materials:

Tools and Materials: pen, pencils, eraser, calculator, telephone, letter pad
Equipments: Computer, OHP, Fax Telephone
Safety:

Task Analysis

Task No: **6 Complete all processes as scheduled**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Study planed activities 2. Identify planed activities 3. Prioritize planed activities 4. Prepare work schedule 5. Review & revise work schedule 6. Implement work schedule 7. Complete planned activities	**Condition(Given):** Class room with required materials & tools **Task (What):** Complete all processes as scheduled **Standard (How well):** Completed all processes as scheduled	➢ Planning ▪ Definition ▪ Types ➢ Job prioritization technique ➢ Work schedule ▪ Definition ▪ Format ▪ Preparing technique ➢ Revision and reviewing Technique

Required tools/equipment/materials:

Tools and Materials: pen, pencils, eraser, calculator, Yearly plan of operation (YPO),
Equipments: Computer, OHP
Safety:

Task Analysis

Task No: **7 Plan for costing and budgeting**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Identify planned activities 2. Identify costing Items 3. Collect related data 4. Analyze data 5. Calculate the income and expenditure for a period 6. List work 7. Prepare plan 8. Prepare budget for the plan	**Condition(Given):** Class room with required materials & tools **Task (What):** Plan for costing and budgeting **Standard (How well):** Planed for costing and budgeting	➢ Planning ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Budgeting ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Data ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Data organization ➢ Estimating and costing ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Estimating procedure and technique

Required tools/equipment/materials:

Tools and Materials: pen, pencils, eraser, calculator, Yearly plan of operation (YPO),
Equipments: Computer, OHP
Safety:

Task Analysis

Task No: **8 Calculate tariffs**		Time: 3 hr Theory: 2 hr Practical: 1 hrs
Performance Steps	**Terminal Performance objectives**	**Related Technical Knowledge**
1. Identify tariffs 2. Calculate energy charge at various tariffs 3. Prepare bill in various tariffs 4. Maintain customer account	**Condition(Given):** Class room with required materials & tools **Task (What):** Calculate tariffs **Standard (How well):** Calculated tariffs in time	➢ Tariffs ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Calculator/ computer using technique ➢ Data organizing technique in table, charts graphs ➢ Rate charge ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Rate change problems ➢ Measurement related to power ➢ Condition of electricity and other charge payment ➢ Types of penalties ▪ Definition ▪ Types ▪ Function ▪ Importance ➢ Rules and regulations of rebate and penalties

Required tools/equipment/materials:
Tools Materials: Computer pen, pencil, eraser, calculator, voucher, bills, customer account book (ledger), cash book, Ledger, Electrical Rules and regulation,**:**
Equipments: Computer, OHP
Safety:

Task Analysis

Task No: **9 Calculate loss/profit in dairy transaction**

Time: 3 hr
Theory: 1 hr
Practical: 2 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Collect all primary records related to volume measurement, fat & SNF testing, dispatch slip & chilling centre/factory receipt. 3. Prepare the format of dairy register. 4. Use the calculator & fill the format of dairy register. 5. Get the loss/gain in fat, SNF volume approved by in-charge.	**Condition(Given):** Loss/gain of each shift transaction has to be found out **Task (What):** Find out the loss/ profit in daily transaction. Maintain the record **Standard (How well):** Daily loss/profit in milk collection activity ascertained.	➢ Arithmetic Calculation ➢ Use of calculator ➢ Filling up dairy register.

Tools/equipment: Calculator, primary records of collection, dairy register.

Task Analysis

Task No:10 **Prepare the milk payment format**

Time: 3 hr
Theory: 1 hr
Practical: 2 hrs

Performance Steps	Terminal Performance objectives	Related Technical Knowledge
1. Receive instructions 2. Fill up the individual farmer's record. 3. Prepare the progress report as Per- payment period. 4. Verify the total fat, quantity & SNF from progress report & individual farmer's record. 5. Prepare the payment form. 6. Fix the date & time for payment. 7. Withdraw the money from the bank & prepare money in various sizes notes to facilitate the payment. 8. Get the signature/finger print of the farmer. 9. Make the payment.	**Condition(Given):** Payment slip has to be prepared & farmers are to be paid for the milk delivered. **Task (What):** Prepare the milk payment format **Standard (How well):** Farmers are paid according to the quality & quantity of the milk received & recorded.	➢ Pricing system ➢ Rate for payment ➢ Use of calculator

Tools/equipment: Calculators, related records, register

OJT for Junior Dairy Technician

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".

In one occupational set up, it is not possible to expose the trainees for all required competencies that they have to master to perform their future job. Moreover, trainers and institution management should take precaution while planning for the OJT placement. Therefore, it is suggested to plan the OJT placement on rotating modality so that the trainees will have enough opportunity to practice the skills enlisted for OJT exposure.

Objectives 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 (Objectives, 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:

a. Related supervisor of organization
b. Related instructor/supervisor of the training institute
c. 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	**200**	**50%**
2.	Related supervisor / instructor of the training institute	**100**	**25%**
3.	External expert	**100**	**25%**
Total		**400**	**100%**

Competencies to be performed during OJT

Trainees are suggested to perform all the critical competencies mentioned above under each module of this **Junior Dairy Technician** curricular program

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DACUM Job Analysis of Junior Technical Assistant (Dairy)

March, 2006

Training for Employment Project

Pulchowk , Lalitpur

List of duties and tasks for Junior Technical Assistant (Dairy)

A Perform milk collection

1. Prepare for milk collection	2. Sample the milk	3. Keep milk test record	4. Measure milk volume	5. Keep farmer's record	6. Filter milk
7. Store milk	8. Chill milk	9. Keep sales record	10. Dispatch milk	11. Keep dispatch record	12. Keep payment record

B Perform milk receptions

B1. Prepare for milk reception	B2. Sample received milk	B3. measure temperature	B4. Verify volume	B5. Prepare gain loss records	B6. Calculate profit and loss

C Perform milk processing.

C1. Prepare for milk processing	C2. Sample bulk milk	C3. Plan for milk production	C4. Preheat milk	C5. Separate cream	C6. Recombine milk
C7. Reconstitute milk	C8. Homogenize milk	C9. Pasteurize milk	C10. Pasteurize cream	C11. Perform phosphates test	C12. Re-standardize milk
C13. Store pasteurized / standardize milk	C14. Fill up milk				

D Perform laboratory tests

D1. Perform organoleptic test	D2. Perform cob / alcohol test of raw milk	D3. Perform acidity test of milk/milk products	D4. Determine fat of milk/milk products	D5. Determine S.N.F. of milk	D6. Determine moisture content of ghee/butter/
D7. Determine ph value of milk	D8. Determine ph value	D9. Perform total solid test of curd/ice-cream	D10. Observe body & texture of milk products	D11. Perform free fatty acid (FFA) test	D12. Perform free detergent concentration test of solution
D13. Determine hardness of water	D14. Determine overrun of ice-cream	D15. Perform soda test	D16. Perform sugar test	D17. Perform glucose test	D18. Perform salt test
D18. Perform formalin test	D19. Perform starch test	D20. Perform urea test	D21. Prepare MBRT solution	D22. Perform MBRT test for grading	

E Prepare starter /Mother Culture

E1. Prepare milk	E2. Sterilize milk	E3. Incubate milk	E4. Propagate culture	E5. Incubate culture	E6. Preserve culture

F Produce milk products

F1. Produce plain butter	F2. Produce table butter	F3. Produce ghee	F4. Produce panneer	F5. Produce khowa	F6. Produce ice cream
F7. Produce curd / yoghurts	F8. Produce jeera butter milk	F9. Prepare lassi	F10. Produce sikarni	F11. Produce chhurpee	F12. Produce sterilized milk

G Sanitize/clean plants

G1. Perform C.I.P.	G2. Sanitize storage tank	G3. Sanitize pipe line	G4. Sanitize pasteurizing plant	G5. Sanitize packing instrument	G6. Sanitize pipeline
G7. Sanitize chilling equipment	G8. Sanitize glassware				

H Market Products

H1. Identify market	H2. Determine demand	H3. Develop market network	H4. Advertise product	H5. Deliver product	H6. Monitor market.
H7. Improve product quality	H8. Improve/provide service quality				

I Communicate with Others

I1. Communicate with senior Supervisor.	I2. Communicate with section Chief	I3. Communicate with farmer	I4. Communicate cooperatives	I5. Communicate dairy boy	I6. Communicate with sales department
I7. Communicate with maintenance supervisor	I8. Communicate with administration section.	I9. Communicate with account section	I10. Communicate with store incharge	I11. Communicate with cleaner	I12. Communicate with transport

J Grow Professionally

J1. Seek training places	J2. Attend trainings	J3. Attend seminars/ workshops related to dairy	J4. Browse www	J5. Watch AV programs related to dairy	J6. Read books / journals related to dairy
J7. Visit other well equipped dairy plant	J8. Visit senior dairy technicians				

Additional Information for **Junior Technical Assistant (Dairy)**

Worker traits	**Entry Requirements**	**Duration of Training Required**	**Career Paths**
Co-operative Creative Disciplined Energetic Ethical Sensitive Responsible Polite Patience Honest	**Education:** 10 class pass **Age:** Minimum 16 years	10 month in the class room and lab practice + 3month *On-the-Job Training,* (OJT**)**	Dairy supervisor Senior dairy supervisor

Related Knowledge

- Definition and composition of milk
- Physiochemical properties of milk
- Nutritive value of milk
- Factor affecting the composition of milk
- Dairy microbiology
- Milk collection cooling & transportation
- Pasteurization of milk
- Production of milk product
- Paneer
- Ice cream
- Butter
- Khoa
- Sikarni
- Chhurpee
- Cleaning flavored milk, cream sanitation
- Sanitization of Dairy Equipments
- Quality test of milk and Milk product
- Communication skills
- Introduction and composition of plain butter
- Introduction and composition of table butter
- Introduction and composition of ghee
- Introduction and composition of pannier
- Introduction and composition of khowa
- Introduction and composition of ice cream
- Introduction and composition of curd / yoghurts
- Introduction and composition of jeera butter milk
- Introduction and composition of lassi
- Introduction and composition of sikarni
- Introduction and composition of sterilized milk

Tools/Equipment

- Plunger
- Milk sampler
- Milk container
- Sample bottle
- Test tube
- G. Burette
- Glass Beaker
- Butyro meter
- Buty renter stand
- Buty renter brush
- Buly renter stopper, key
- Milk pipette
- Milk pipette brush
- Gradual pipette
- Lactometer
- Thermometer
- Country fage
- Aluminum can
- Filter cloth
- Milk chilling vat
- Milk measuring device
- Product packing polythine film
- Plastic cups
- Electric balance
- Cheese mould
- Bacteriologies pipette
- Over
- Incubator
- Batch sterilizer
- Paneer hoops
- Ice-cream machine
- Yoghurts incubator
- Butter churn
- Hand butter moulding set
- Homogenizer
- Batch pasteurizer
- Adulteration testing kit

DACUM Panel
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Panchali Bhairav

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DACUM Job Analysis of Sweet Maker

April, 2006

Training for Employment Project

Pulchowk , Lalitpur

List of duties and tasks for Sweet Maker

A Manage works

13. Boil chash	14. Make dough	15. Measure milk fat	16. Boil milk	17. Prepare chinapani	18. Measure weights.

B Communicate with others

B1. Communicate with waiter.	B2. communicate with helper	B3. communicate with colleagues	B4. communicate with store keeper	B5. Communicate with chef	

C Prepare milk based sweets

C1. Prepare Chumcham	C2. Prepare Gulab jamun	C3. Prepare cream chumchum	C4. Prepare Kheer Kadam	C5. Prepare Ras kadam	C6.Bake milk cake
C7. Set Panir	C8. Dry Lalmohan	C9. Prepare Rasbari	C10. Prepare Calgan	C11. Prepare Sandesh	C12.Prepare sandesh Cream
C13. Prepare Dud Malai	C14. Prepare Khoa	C15. Prepare Lalmohan	C16. Prepare Rabari	C17. Prepare Keshari	C18. Prepare Rajbhog.

D Prepare beshan based sweets

D1. Prepare Laddu	D2. Prepare Bhujia	D3. Prepare sonpapadi	D4.Prepare Papad	D5. Prepare Buniya	D6. Prepare Motisak ko laddu
D7. Prepare Bhujiya shayu	D8. Prepare Jeri	D9. Prepare Mansur Pat	D10. Prepare Kachauri		

E. Prepare mung/chawal based items

E1. Bake Bara	E2. Bake Dosa	E3. Bake Idaly	E4. Prepare Masala Dosa	E5. Prepare Plain Dosa	

F Prepare ata (Flour) based items

F1. Fry Roti	F2. Fry Puri	F3. Prepare Guj ko Laddu	F4. Prepare Haluya	F5. Fry Panipuri	

G. Prepare maida based sweets

G1.Fry Nimki	G2. Prepare Samosa	G3. Prepare balusar	G4. Prepare Gaga	G5. Prepare Khaja	G6. Fry rote
G7. Prepare Khajuri	G8. Prepare Panipuri	G9. Fry Bhature	G10. Prepare Aitha	G11. Prepare Balshai	G12.Prepare Gaja
G13. Prepare Minu samosa	G14. Prepare Tri- Kanta	G15. Prepare Kaju Nimki	G16. Prepare Kaju Nimki	G17. Prepare Khasta Nimki	G18. Prepare Tukra Nimki

H Prepare khoa based sweets

H1. Prepare/set Peda	H2 Prepare/set Barafi	H3. Prepare Role peda	H4. Prepare Kaju Barfi	H5. Prepare Kaju Roll	H6. Prepare barfi Ledo
H7. Prepare Jam barfi	H8. Prepare Kaju lemon	H9. Prepare Pesta Barfi	H10. Prepare pesta Roll	H11. Prepare Gajor ho Haluya	H12. Prepare Khuya Roll
H13. Prepare Chocklate roll	H14. Prepare Pista Roll	H15. Prepare peda Cream	H16. Prepare Khuya Laddu.		

I Prepare pickle(Chateni)

I 1. Prepare emly pickle	I 2. Prepare coconut pickle	I 3. Prepare ginger pickle	I 4. Prepare dosa masala	I 5 Prepare samosa masala	I 6 Prepare chokha
I 7 Prepare tomato pickle	I 8 Prepare Samber	I9. Prepare coriander pickle			

J Grow professionally

J1. Seek training places	J2. Attend trainings	J3. Attend seminars/ workshops related to sweet making.	J4. Learn from Collogues..	J5. Read books / journals related to Sweets	J6. Collect recipes
J7. Visit other well equipped Kitchen.					

Additional Information for **Sweet Maker**

Worker traits	**Entry Requirements**	**Duration of Training Required**	**Career Paths**
Co-operative Creative Disciplined Energetic Sensitive Responsible Polite Patience Honest	Grade 5 pass **Age:** Minimum 15 years	6 months Basic sweets preparation	Head Mastery

Related Knowledge

- Basic principal of sweets
- Concept of Sweet decorations.
- Combination of sweets
- Dairy microbiology
- Dairy products
- Application of cooking utensils.
- Quality of milk
- Concept color of sweets
- Quality of dry grocery.
- Uses of measurement tools.
- Application of cutting tools.
- Use of roller and board
- Concept of Weight and measurement
- Types and quality of milk
- Preservation of milk items
- Chemicals used for sweets
- Proper use of edible colour.
- Proper use of bhatti.
- Concept of temperature
- Concept of cooking range
- Storage of half done Khoa.
- Concept of recipe.
- Concept of proper storage.
- Concept of health and hygiene.
- Concept of safety perceptions.
- Preparation of pickle vegetable.
- Person and quality of sweets
- Concept of first –Aid.

Tools/Equipment

- Knife
- Cooking pot
- Fry pen.
- Ladder
- kistey
- wodden ladder.
- Mixer grinder
- Napul
- Roller
- Jhari
- Range
- Karai
- Flower knife.
- Cylinder
- Dust bean
- Chimta
- Scale(Listi)
- Bhatti
- Bata
- Décor Kisti
- Khurpi
- Chabi(Key)
- Round pata(Plate)
- Plain pata
- Butter paper
- Cap
- Cold dish plate
- Basket
- Sweet cap
- Oven Range
- Stove
- Cholne Khurpi
- Big cholne
- Show case
- Micro oven
- Washing Bashain.

Verified List of duties and tasks for Sweet Makers

A Prepare desiccated milk based sweets.

19. Prepare khoa	20. Prepare Gulab jamun	21. Prepare kala-jamun	22. Prepare Pantua	23. Prepare Lalmohan	24. Prepare Burfi
25. Prepare Kalakand	26. Prepare Milk cake	27. Prepare Peda	28. Prepare Rabri	29. Prepare Kulfi	

B Prepare heat Acid coagulated products.

B7. Prepare Chhana	B8. Prepare Rasogolla	B9. Prepare Rasomalai	B10. Prepare Rajbhog	B11. Prepare Khir mohan	B12. Prepare Sandesh
B13. Prepare Chhana Murki	B14. Prepare Cham-cham	B15. Prepare Sitabhog	B16. Prepare Chhana Gaja	B17. Prepare Chhana Pakora	

C Prepare cultured / Fermented Products.

C15. Prepare Mishti Doi	C16. Prepare Shrikhand (Sikarni)	C17. Prepare Lassi	C18. Prepare Kadhi	C19. Prepare Raita	C20. Prepare Dahi Vada

D Prepare milk based puddings / Desserts.

D15. Prepare Kheer	D16. Prepare Lauki Kheer	D17. Prepare Sohan Halwa	D18. Prepare Gajar-ka-Halwa	D19. Prepare Kaju Burfi

List of Tools and Equipment

Dairy Technology

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 Making

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.

➢ References

1 **A Hand Book of Dairy Technology**, Alfa- Laval, Sweden
2 **Dairy Technology & Engineering,** Harper & Hall
3 **Hand Book of Food Analysis,** Part iv, Bureau of Indian Standards, New Delhi.
4 **Laboratory Hand Book,** National Dairy Development Corporation, Kathmandu
5 **Laboratory Manual,** Dairy Development Corporation, Lainchour, Kathmandu.
6 **Technology of Indian Milk Products,** Aneja & et al.
7 **दुग्ध उत्पादन,** नीरबहादुर जिरेल, प्रा.शि. तथा व्या. ता. परिषद्, सानोठिमी, भक्तपुर ।

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An Additional Basic Sub-Module

Module Code: M 0

Sub module Code: SM 0.0

Sub module Title: Care and management of dairy/milch animals

Description

This course is designed to help trainees to provide knowledge and skills on care and management of dairy/milch animals. This course deals with the basic concept on care and management of dairy/milch animals. However, this course is offered as common sub module for both the dairy and sweet making stream. *It is not a compulsory sub-module. However, the interested institutes may offer this sub- module if they feel its need. Offering of this sub-module will increases the total duration of the program by 30 hours. There will be on change in full marks. The trainees should also need to practice skills related to this sub-module during OJT if this sub- module is offered.*

Duration: 30 hours

Competencies

1. Identify common dairy animal breeds found in Nepal
2. Care / manage pregnant milch animal
3. Care / manage new born calves
4. Provide concept of housing for milch animal
5. Identify common internal / external parasites of milch animals
6. Prevent common internal / external parasites of milch animals
7. Prevent infertility
8. Provide first aid for retained placenta
9. Provide first aid for prolapsed of vagina and uterus
10. Provide first aid for dystocia

Task Analysis

Task: 1. Identify common dairy animal breeds found in Nepal		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1.Receive instructions 2. Enlist different milch/ dairy breeds of cattle and buffalo found in Nepal namely: ▪ European milch breeds o Holstein Friesian o Jersey o Brown-swiss o Ayrshire ▪ Indian milch breed o Sahiwal ▪ Indian buffalo breed o Murrah o Nili-Ravi 3. Enlist characteristics of above breeds with their distinct features. 4. Identify common dairy animal breeds[of step no.2] found in Nepal 5. Prepare labeled figures of above breeds and demonstrate on laboratory session. 6. Keep records	**Condition (Given):** Common dairy animal breeds **Task (What):** Identify common dairy animal breeds found in Nepal **Standard (How well):** The common dairy animal breeds found in Nepal well identified and their characteristics with distinct features enlisted.	➢ Historical background, origin, present situation of milch breed of cattle and buffaloes commonly found in Nepal. ➢ Characteristics of milch breeds found in Nepal with special consideration to their production capacity, body weight and feeding habits.

Required materials, tools, animals: Available animal species and breeds, charts, figures, board, demonstration table etc

Task Analysis

Task 2. Care and manage milch animal		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1.Receive instruction 2. Care and manage pregnant milch animal before parturition in terms of: • Pregnancy diagnosis • Nutrition • Housing • Health • Others 3. Care and manage milch at animal parturition in terms of • Sign of pregnancy • Delivery fetus • Expulsion of placenta 4. Care and manage lactating animals in terms of: • Nutrition • Housing • Milking method • Health • Others 5. Keep records	**Condition (Given):** Related Books, manual, the actual pregnant animal and necessary resources in farm condition. **Task (What):** Care and manage milch animal **Standard (How well):** Care and management of milch animals carried out taking all the necessary precautions well in advance.	➢ Concept of: ▪ Pregnancy ▪ Parturition ▪ Lactation. ▪ Pregnancy diagnosis ▪ Sign of pregnancy ▪ Delivery fetus ▪ Expulsion of placenta ▪ Milking method ▪ Nutrition ▪ Housing ▪ Health ➢ Principles and procedures of the care and management of dairy/milch animals.

Required materials and animals: Related books, manual, pregnant animals, necessary resources in farm, charts, models etc.

Task Analysis

Task 3. Care and manage new born calves		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1.Receive instructions 2. Facilitate normal breathing of newly born 3. Perform cleaning of newly born 4. Disinfect naval cord 5. Help/ train for suckling the milk 6. Feed colostrums 7. Perform ▪ Dehorning ▪ Drenching/ deworming ▪ Vaccination 8. Care and manage ▪ Nutrition ▪ Housing ▪ Health.	**Condition (Given):** Newly born calf with required material in field condition. **Task (What):** Care and manage the newly born calf. **Standard (How well):** The newly born calf well managed following all the necessary precautions.	➢ Concepts and importance of care and management of newly born calf. ➢ Principles and procedures of the care and management of newly born calf. ➢ Precautions to be taken

Task Analysis

Task: 4. Provide concept of housing for milch animal.		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Receive instruction 2. Study learning materials 3. Prepare task notes 4. Explain milch animal housing 5. Name the material used in constructing milch animal housing and milk parlor. 6. Perform: ▪ Cleaning and disinfection of milk barn ▪ Explain use and importance of proper ventilation 7. Prepare a model shed by using local materials.	**Condition (Given):** Related books, Manuals, Housing management plan format and necessary resources. **Task(What)** Manage housing of milch animals **Standard (How well):** The concept about housing management developed and a plan for milch animal housing well prepared.	➢ Different types milch animal house, ➢ Milking parlor ➢ Importance of proper housing for milch animals

Required materials:
Related books, Manuals, Housing management plan format and livestock farm.

Task Analysis

Task 5: Identify common internal and external parasites of milch animals.		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. List common internal and external parasites of milch animals: • Internal parasites: ▪ Liver fluke ▪ Paramphistomum ▪ Moniezia tape worm ▪ Large round worms (Ascaris) ▪ Small round worms (Haemonchus) etc • External parasites: ▪ Lice ▪ Tick ▪ Flea ▪ Mites etc 2. 2. Collect internal adult parasites from fresh house, slaughter house or from dead animals directly. 3. Collect external parasites from skin surfaces with forceps after moistening the skin with 70 % alcohol. 4. Preserve parasites in specimen jar with 10% formalin or 70% alcohol. 5. Label parasites with taxonomical classification. 6. Arrange collected parasites on demonstration table. 7. .Name and explain one by one with characteristics features. 8. .Process the specimen with standard methods to observe internal parts. 9. Observe processed specimen under microscope. 10. Draw labeled diagram on your practical record book.	**Condition (Given):** Related books, manuals, specimens of parasites, charts etc **Task (What):** Identify common internal and external parasites of milch animals. **Standard (How well):** The common internal and external parasites of milch animals identified, collected, and preserved in specimen jars taking all the necessary precautions. .	➢ Internal and external parasites of livestock. ➢ Collection, preservation and labeling the parasites ➢ Precautions to be taken ➢ Records keeping

Required tools, equipments and chemicals: Specimen jar, 10% formalin, microscope, slides, staining materials, 70% alcohol, methylene blue, xylene glycerin etc.

Task Analysis

Task 6: Prevent common internal and external parasites of milch animals.		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. List the name of common anthelmintics found in local market: • Albendazole, • Fenbendazole, • Mebendazole • Levamisol, • Tetramisol, • Oxyclozanide, • Rafoxanide etc 2. List the name of ectoparacidals. 3. Arrange animal health campaign in the community nearby institute. 4. Calculate and estimate the dose rate for different species and different age groups. 5. Control the animal in Travis for large animals and with appropriate method for small animal. 6. Drench antihelmintics or provide tablet or bolus with feeds for internal parasites 7. Apply ectoparacidal one by one. 8. Take care for possibility of aspiration for liquid drugs. 9. Provide doctors prescription and necessary advices. 10. Advise farmer for routine drenching of milch animals. 11. Arrange awareness programs regarding prevention of animal from internal and external parasites. 12. Keep record	**Condition (Given):** Related books, manuals, samples of antihelmintics, charts etc **Task (What):** Prevent common internal parasites of milch animals. **Standard (How well):** The common internal parasites of milch animals well prevented following all the necessary precautions well in advance.	➢ Identification and use of antihelmintics. ➢ Precautions to be taken ➢ Records keeping

Required tools, equipments and chemicals: Antihelmintics, Poster, pamphlets, drenching dun, boiling gun , Travis etc.

Task Analysis

Task 7: Prevent infertility.		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1.Receive instruction 2.List the name of common causes of infertility. 3.Arrange infertility campaign in the community nearby institute. 4.Assist vet doctors to inspect animal for possible causes of infertility. 5.Read prescription and advices provided by doctor to the farmers and assist to explain it. 6.Administer drugs prescribed by doctors with in appropriate methods. 7.Take care and precautionary measures during administration of drugs. 8.Keep record. 9.Provide doctors prescription and necessary advices. 10. Advise farmer for routine drenching and feeding of balanced ration. 11. Arrange awareness programs regarding prevention of infertility in different communities.	**Condition (Given):** Related books, manuals, drug sample used to treat and prevent infertility **Task (What):** Prevent infertility. **Standard (How well):** Causes of infertility in dairy animals listed and techniques for preventing infertility applied well in advance taking all the necessary precautions.	Infertility in dairy animals: ➢ Concept of infertility ➢ Disadvantages of infertility ➢ Causes of infertility ➢ Drugs to prevent infertility ➢ Care and precautions to be taken while administering the drugs for the prevention of infertility in dairy animals ➢ Records keeping

Required tools, equipments and chemicals: Antihelmintics, Mineral mixture, Tonophosphan. Vit A injection, Syringe, Needle, Poster, pamphlets, drenching dun, boiling gun, Travis etc.

Task Analysis

Task 8: Provide first aid for animal with retained placenta.		Time: 3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Keep the patient animal at comfortable place and provide lukewarm water with some molasses or 100 gm dextrose powder. 2. Assist new born calf for suckling of milk which cause myometrial contraction and thus help to expulse retained placenta. 3. Provide ecbolic or ergometric drugs such as replant, exapar or clinosol in case the placenta has retained more than 12 hours. 4. Keep the barn clean and hygienic with appropriate measure of cleanliness and disinfection. 5. If possible tie a weight of about 250 gm on hanged placenta to help come out with pulling force. 6. Try the placenta to pull out with gentle traction but do not apply more force until it detach out. 7. Seek advice or help of veterinarian in case all the efforts failed.	**Condition (Given):** Related books, manuals, dummy animal, actual clinical cases if possible. **Task (What):** Provide first aid for animal with retained placenta. **Standard (How well):** First aid for animal with retained placenta well provided /given taking all the necessary precautions in right time, place and manner.	➢ Meaning and causes of retained placenta. ➢ First aids in case of retained placenta. ➢ Precautions to be followed ➢ Records keeping

Required tools, equipments and chemicals: Ecbolic drugs, Poster, pamphlets, drenching dun, boiling gun, Travis, dummy etc.

Task Analysis

Task 9: Provide first aid for animal with prolapsed vagina and uterus.		Time: 3 hrs Theory: 1 hr Practical: 2hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Place the animal at comfortable place with soft bedding materials. 2. Protect animal from injury to the prolapsed parts. 3. Control bleeding by applying pressure over injured part with gauze soaked with betadine solution or appropriate antiseptics. 4. Clean prolapsed parts in case there is more filth, dirt and dusts stickled over the prolapsed area. 5. Try to keep animal standing so that the organs go into its on place. 6. Seek immediate help of veterinarian if it the case is completing uterine prolapsed. 7. Keep record. 8. Provide doctors prescription and necessary advices after correction. 9. Advice farmer for about proper housing and feeding management in order to control prolapsed.	**Condition (Given):** Related books, manuals, dummy animal, actual clinical cases if possible. **Task (What):** Provide first aid for animal with prolapsed vagina and uterus. **Standard (How well):** First aid for animal with prolapsed vagina and uterus well provided /given taking all the necessary precautions in right time, place and manner.	➢ Meaning and causes of prolapsed vagina and uterus in milch animals. ➢ Prevention and correction of vagina and uterus prolepses. ➢ Precautions to be taken ➢ Records keeping

Required tools, equipments and chemicals: Dummy animal, Poster, pamphlets, actual case of prolapsed etc.

Task Analysis

Task 10: Provide first aid for animal in dystocia.		Time:3 hrs Theory: 1 hr Practical: 2 hrs
Performance steps	**Terminal Performance Objective**	**Related Technical Knowledge**
1. Check your record to confirm date of conception and probable date of calving/parturition. 2. Observe carefully whether the symptoms are really that of labor pain or due to colic. 3. Check the time of coming out chorio-allantoic fluid (water bag). 4. Observe carefully and note the frequency of straining. 5. Check the pits both sides on the base of tail due to relaxed pelvic ligaments. 6. Check any organs especially leg(s) can be seen that coming out through birth canal. 7. Seek veterinary help if there is continue straining or symptom prolongs more than six hours but no birth of new ones.	**<u>Condition (Given):</u>** Related books, manuals, dummy animal, actual clinical cases if possible. **<u>Task (What):</u>** Provide first aid for animal in dystocia. **<u>Standard (How well):</u>** Provided first aid for animal in dystocia. First aid for animal in dystocia well provided /given taking all the necessary precautions in right time, place and manner.	➢ Meaning and causes of dystocia. ➢ First aid in dystocia. ➢ Correction of dystocia in large and small animals. ➢ Precautions to be followed ➢ Records keeping

Required tools, equipments and animals: Dummy animal, Poster, pamphlets, actual case of dystocia etc.

Course Structure for Junior Dairy Technician

[With an additional basic sub-module of "Care and management of dairy/milch animals"]

S.N.	Code	Modules and sub-modules	Nature	Total hours	Full marks
1.	**M 0**	**Mo: Basic Module** • Care and management of dairy/milch animals Basic Concepts of Dairy Technology • Applied English • Basic Mathematics • Basic Science and Basic Hygiene	**T+P**	**160**	**100**
2	**M 1**	**M1: Dairy Science and Technology** • Basic Milk Processing Technology • Dairy Technology & Processing of Milk Products • Laboratory Tests • Equipments Cleaning& Sanitization	**T+P**	**520**	**400**
3.	**M 2**	**M2: Sweet Making** • Desiccated milk based sweets • Heat Acid Coagulated products • Cultured / Fermented Products • Milk based Puddings / Desserts	**T+P**	**260**	**200**
4	**M 3**	**M3: Entrepreneurship Development** • Generic Skills • Entrepreneurship Skills • Sales and Marketing • Accounting and Presentation of Skills	**T+P**	**130**	**100**
Total				**1070**	**800**
On-the-Job Training (OJT) 4 months			**P**	**640**	**400**
Grand total				**1710**	**1200**

Basic Module structure

[With an additional basic sub - module of "Care and management of dairy/milch animals"]

Duration: 160 hours

Module Structure (M 0)

S.N.	Code	Sub-modules	Nature	Total hours	Full marks
6.	SM 0.0	Care and management of dairy/milch animals	T+P	160	100
7.	SM 0.1	Basic Concepts of Dairy Technology			
8.	SM 0.2	Basic English	T		
9.	SM 0.3	Basic Mathematics	T		
10.	SM 0.4	Basic Science & Hygiene	T		
Total				**160**	**100**