# Model Curriculum

**QP Name: Dairy Product Processor**

**Code: FIC/Q2001**

**QP Version: 3.0**

**NSQF Level: 4**

**Model Curriculum Version: 3.0**

Food Industry Capacity and Skill Initiative
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# Training Parameters

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|---|---|
| **Sector** | Food Processing |
| **Sub-Sector** | Dairy Products |
| **Occupation** | Processing- Dairy Products |
| **Country** | India |
| **NSQF Level** | 4 |
| **Aligned to NCO/ISCO/ISIC Code** | NCO-2015/7513.0300 |
| **Minimum Educational Qualification and Experience** | 12th-grade pass or Equivalent<br>OR<br>10th Grade Pass - 3 years of experience in Food Processing/Dairy Industry<br>OR<br>Previous relevant Qualification of NSQF Level 3.5 - 1.5 years of experience in Food Processing/Dairy Industry<br>OR<br>Previous relevant Qualification of NSQF Level 3.0 - 3 years of experience in Food Processing/Dairy Industry |
| **Pre-Requisite License or Training** | NA |
| **Minimum Job Entry Age** | 18 years |
| **Last Reviewed On** | 29/08/2024 |
| **Next Review Date** | 28/08/2027 |
| **NSQC Approval Date** | 29/08/2024 |
| **QP Version** | 3.0 |
| **Model Curriculum Creation Date** | 15/07/2024 |
| **Model Curriculum Valid Up to Date** | 28/08/2027 |
| **Model Curriculum Version** | 3.0 |
| **Minimum Duration of the Course** | 480 Hours (60+90+90+30+60+ 90+60) |
| **Maximum Duration of the Course** | 900 Hours (60+90+90+30+60+ 60+180+120+120+ 90) |

# Program Overview

This section summarises the end objectives of the program along with its duration.

## Training Outcomes

At the end of the program, the participants will be able to:

- Manage raw materials and ensure their quality for various dairy products.
- Understand and apply fermentation processes for producing fermented dairy products.
- Operate and maintain equipment used in dairy processing, including pasteurizers, homogenizers, separators, freezers.
- Produce a wide range of dairy products, including toned, fat, low-fat, flavoured milk, yoghurt, cheese, lassi, shrikhand, butter, ghee, cream, khoa, channa, condensed milk.
- Implement quality assurance measures and maintain accurate records throughout the production process.
- Apply food safety guidelines, good manufacturing practices (GMP), and hygiene standards to ensure product safety and quality.
- Understand and comply with relevant regulations and standards in the dairy industry.
- Troubleshoot common production issues and implement corrective actions.

## Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **FIC/N9026 Prepare for production<br>NOS Version No.: 1.0<br>NSQF Level: 3.5** | **20:00** | **40:00** | **00:00** | **00:00** | **60:00** |
| Module 1: Introduction to the Food Processing Sector | 04:00s | 00:00 | 00:00 | 00:00 | 04:00 |
| Module 2: Prepare Workplace and Equipment | 16:00 | 40:00 | 00:00 | 00:00 | 56:00 |
| **FIC/N2032: Produce Cultured Dairy Products<br>NOS Version No.: 1.0<br>NSQF Level: 4** | **30:00** | **60:00** | **00:00** | **00:00** | **90:00** |
| Module 3: Produce Toned, Fat, Low-Fat, and Flavored Milk | 15:00 | 30:00 | 00:00 | 00:00 | 45:00 |
| Module 4: Produce Flavored Milk and Uphold the Quality Assurance Standards | 15:00 | 30:00 | 00:00 | 00:00 | 45:00 |

| | | | | | |
|---|---|---|---|---|---|
| **FIC/N2033 - Carry Out Post-Production Activities NOS Version 1.0 NSQF Level: 4** | **30:00** | **60:00** | **00:00** | **00:00** | **90:00** |
| **Module 5:** Carryout Post-Production Operations in Dairy Processing | **30:00** | **60:00** | **00:00** | **00:00** | **90:00** |
| **FIC/N9906 – Apply food Safety guidelines in Food processing NOS Version No. 1.0 NSQF Level 3** | **10:00** | **20:00** | **00:00** | **00:00** | **30:00:00** |
| **Module 6:** Practice personal hygiene and follow Good Manufacturing Practices at the workplace | **5:00** | **10:00** | **00:00** | **00:00** | **15:00** |
| **Module 7:** Apply food safety practices at the workplace | **5:00** | **10:00** | **00:00** | **00:00** | **15:00** |
| **DGT/VSQ/N0101 Employability Skills NOS Version No.: 1.0 NSQF Level: 2** | **20:00** | **40:00** | **00:00** | **00:00** | **60:00:00** |
| **Module 8 :** Employability skills | **20:00** | **40:00** | **00:00** | **00:00** | **60:00:00** |
| **Total Duration** | **110:00** | **220:00** | **60:00** | **00:00** | **390:00** |

## Elective Modules

Elective Modules The table lists the elective modules, their duration, and their mode of delivery. It is mandatory to select at least one elective.

**Elective 1: Produce Cultured Dairy Products**

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **FIC/N2034: Produce Cultured Dairy Products NOS Version 1.0 NSQF Level: 4** | **60:00** | **90:00** | **30:00** | **00:00** | **180:00** |
| **Module 9:** Producing Cheese and Curd | **20:00s** | **30:00** | **00:00** | **00:00** | **50:00** |
| **Module 10:** Producing Lassi and Shrikhand | **20:00s** | **30:00** | **00:00** | **00:00** | **50:00** |
| **Module 11:** Equipment Operation and Maintenance in | **20:00s** | **30:00** | **00:00** | **00:00** | **50:00** |

| | | | | | |
|---|---|---|---|---|---|
| Fermented Dairy Production | | | | | |
| **Total Duration** | **60:00** | **90:00** | **30:00** | **00:00** | **180:00** |

**Elective 2: Produce Fat-Based Dairy Products**

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **FIC/N2035: Produce Fat-Based Dairy Products NOS Version 1.0 NSQF Level: 4** | **36:00** | **54:00** | **30:00** | **00:00** | **120:00** |
| **Module 12:** Raw Material Management and Cream Separation | **09:00** | **12:00** | **00:00** | **00:00** | **21:00** |
| **Module 13:** Produce Butter & Ghee | **09:00** | **14:00** | **00:00** | **00:00** | **23:00** |
| **Module 14:** Produce Different Types of Cream | **09:00** | **14:00** | **00:00** | **00:00** | **23:00** |
| **Module 15:** Produce Khoa and Channa | **09:00** | **14:00** | **00:00** | **00:00** | **23:00** |
| **Total Duration** | **36:00** | **58:00** | **30:00** | **00:00** | **120:00** |

**Elective 3: Produce Frozen Dairy Products**

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **FIC/N2036: Produce Frozen Dairy Products NOS Version 1.0 NSQF Level: 4** | **36:00** | **54:00** | **30:00** | **00:00** | **120:00** |
| **Module 16:** Master Ice Cream Production: From Mix to Delight | **18:00** | **27:00** | **00:00** | **00:00** | **45:00** |
| **Module 17:** Produce Frozen Yogurt | **18:00** | **27:00** | **00:00** | **00:00** | **45:00** |
| **Total Duration** | **36:00** | **54:00** | **30:00** | **00:00** | **120:00** |

**Elective 4: Produce Condensed and Dried Dairy Products**

| NOS and Module Details | Theory Duration | Practical Duration | On-the-Job Training Duration (Mandatory) | On-the-Job Training Duration (Recommended) | Total Duration |
|---|---|---|---|---|---|
| **FIC/N2037: Produce Condensed and Dried Dairy Products**<br>**NOS Version 1.0**<br>**NSQF Level: 4** | **36:00** | **54:00** | **30:00** | **00:00** | **120:00** |
| **Module 18:** Produce Frozen Yogurt | **18:00** | **27:00** | **00:00** | **00:00** | **45:00** |
| **Module 19:** Produce Sweetened Condensed Milk | **18:00** | **27:00** | **00:00** | **00:00** | **45:00** |
| **Total Duration** | **36:00** | **54:00** | **30:00** | **00:00** | **120:00** |

# Module Details

## Module1: Introduction to the Food Processing Sector
***Mapped to NOS FIC/N9026 v1.0***

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Discuss the roles and opportunities available for ice cream processing technician
- Explain food processing and its sub-sectors
- Discuss the current market and future trends of the food processing sector

| **Duration**: *04:00* | **Duration**: *00:00* |
|---|---|
| **Theory –Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Discuss the food processing industry and its growth trends.<br>• List the various sub-sectors of the food processing industry<br>• Discuss the future trends and career growth opportunities available to Dairy Products Processors in the food processing industry.<br>• Summarize the key roles and responsibilities of the Dairy Products Processor.<br>• List and describe the different activities undertaken in the processing of Dairy Products Processor.<br>• Identify and describe the potential applications of Industry 4.0 technologies, such as sensors, data analytics, and machine learning, in optimizing dairy production processes, enhancing quality control, and improving efficiency. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Nil | |

## Module 2: Prepare Workplace and Equipment
*Mapped to FIC/N9026 v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Discuss the preparation tasks to be performed for dairy processing
- State the importance of maintaining tools and equipment effectively

| **Duration**: 16:00 | **Duration**: *40:00* |
|---|---|
| **Theory –Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Elucidate the production planning process.<br>• List the manpower and material requirements as per work requirements.<br>• Discuss the importance of various process charts, product flow charts, resource management processes, etc.<br>• List the priority of tasks as per the work schedule.<br>• Recall the steps to plan the capacity utilization of machinery concerning the processing time, production order and batch size for each product.<br>• Recall various steps required to organize production materials appropriately.<br>• Calculate capacity utilization of machinery based on processing time, production order, and batch size. | • Demonstrate the procedure for obtaining work requirements from supervisors.<br>• Prepare samples to plan and prioritize work schedules<br>• Demonstrate how to estimate the resources as per the requirement (raw materials, packaging materials, machinery, and manpower)<br>• Employ appropriate practices to plan capacity utilization of machinery<br>• Demonstrate how to organize production materials appropriately.<br>• Demonstrate how to allot responsibilities to the helpers.<br>• Demonstrate cleaning and sanitation procedures for the work area and machinery used Dairy production. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Raw materials, racks, utensils, Fire extinguishers, High-speed exhausts, Masks – Headcover, mouth cover, cleaning ingredients and tools, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual | |

## Module 3: Produce Toned, Fat, Low-Fat, and Flavored Milk
*Mapped to FIC/N2032: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Demonstrate expertise in receiving, testing, and storing milk procedures, ensuring incoming dairy ingredients' safety, quality, and traceability.
- Accurately standardise raw milk to desired fat and SNF levels for toned, fat, and low-fat milk, achieving consistent product composition and meeting regulatory requirements.
- Operate and maintain pasteurisation and homogenisation equipment effectively, ensuring milk safety and achieving desired product texture and stability.

| Duration: *15:00* | Duration: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List the different quality and safety certifications relevant to dairy suppliers (e.g., HACCP, ISO 22000).<br>• Describe the key components of a supplier contract and their importance.<br>• Outline the recommended storage conditions (temperature, humidity) for various dairy ingredients.<br>• Explain the FIFO (First-In, First-Out) principle and its role in inventory management.<br>• Define milk standardization and its purpose in dairy processing.<br>• Describe the process of pasteurization and its impact on milk safety.<br>• Explain the purpose and effects of homogenization on milk.<br>• Analyze how different storage methods affect the quality and shelf life of dairy ingredients.<br>• Explain the relationship between storage temperature, packaging, and the shelf life of milk.<br>• Compare the suitability of different packaging materials for milk based on their properties.<br>• Interpret quality control data (e.g., fat content, SNF, acidity) to identify deviations from standards.<br>• Analyze the causes of common quality defects in toned, full-fat, and low-fat milk. | • Utilise assessment tools to evaluate and select dairy suppliers based on specified criteria.<br>• Perform sensory evaluation and basic laboratory tests on incoming dairy ingredients to assess quality.<br>• Demonstrate the correct procedures for receiving, sampling, and testing dairy ingredients, maintaining traceability.<br>• Implement FIFO in the storage of dairy ingredients.<br>• Accurately standardize raw milk to achieve the desired fat and SNF levels for toned, full-fat, and low-fat milk.<br>• Operate pasteurization equipment, adhering to SOPs and monitoring critical process parameters.<br>• Operate homogenization equipment, adjusting parameters to achieve desired results.<br>• Troubleshoot common problems encountered during milk processing (e.g., variations in fat content, inconsistent homogenization).<br>• Suggest improvements to existing procedures for receiving, storing, or processing milk to enhance efficiency or quality. |

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| • Evaluate the effectiveness of different quality control measures used in dairy processing.<br>• Develop a simple plan for the production of a batch of toned milk, considering ingredient management, processing steps, and quality control.<br>• Assess the potential risks associated with improper handling of dairy ingredients and suggest preventive measures.<br>• Evaluate the environmental impact of different milk packaging options and recommend sustainable alternatives. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook | |
| **Tools, Equipment and Other Requirements** | |
| Supplier assessment forms and checklists, milk intake and quality records (paper or digital), thermometers for checking milk temperature, sampling equipment (dippers, sample bottles), laboratory testing equipment (fat analyser, total solids analyser, pH meter), refrigeration units for storing milk samples and raw milk, cleaning and sanitising supplies, Standard Operating Procedures (SOPs) for receiving and storing milk, Safety Data Sheets (SDS) for cleaning chemicals, milk standardisation calculator or software, pasteuriser (batch or continuous), homogeniser, and refrigerated milk storage tanks. | |

## Module 4: Produce Flavored Milk and Uphold the Quality Assurance Standards
*Mapped to FIC/N2032: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Develop and produce various flavoured milk products with consistent flavour, aroma, appearance, and texture.
- To ensure product safety and compliance, implement quality control measures throughout production, including sensory evaluation and laboratory testing.
- Utilise ERP and SCADA systems to efficiently manage production schedules, inventory, and critical process parameters.
- Implement traceability systems (such as barcodes or RFID) to track product movement from raw materials to finished goods, ensuring accountability and rapid response to quality issues.

| **Duration**: *15:00* | **Duration**: *30:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Define the different categories of flavoring ingredients (natural vs. artificial) used in flavored milk.<br>• List common sweeteners used in flavored milk and their impact on nutritional value.<br>• Outline the basic principles of sensory evaluation in food production.<br>• Describe the concept of traceability in the dairy industry.<br>• Explain the purpose and basic functions of ERP and SCADA systems in dairy processing.<br>• Analyze how different processing methods affect the flavor stability and shelf life of flavored milk.<br>• Compare and contrast the sensory characteristics of various flavored milk varieties.<br>• Analyze the impact of different factors (ingredients, processing, storage) on the final quality of flavored milk.<br>• Interpret quality control data to identify deviations from standards in flavored milk.<br>• Explain the benefits and drawbacks of different traceability technologies (barcodes, RFID). | • Prepare different flavored milk bases according to provided recipes.<br>• Accurately measure and add flavoring ingredients and sweeteners to milk bases.<br>• Conduct sensory evaluation of flavored milk, assessing key attributes.<br>• Perform quality control tests on flavored milk (e.g., fat content, total solids, acidity).<br>• Record production data and quality control results using appropriate documentation methods.<br>• Interpret quality control data for flavored milk and implement corrective actions to address deviations.<br>• Troubleshoot common problems in flavored milk production (e.g., inconsistent flavor, sedimentation).<br>• Evaluate the effectiveness of different mixing techniques for incorporating flavorings into milk. |

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|---|---|
| • Evaluate the effectiveness of different quality assurance practices in flavored milk production.<br>• Develop a simple HACCP plan for a flavored milk production line, identifying critical control points.<br>• Assess the role of technology (ERP, SCADA) in improving quality control and efficiency in dairy processing.<br>• Propose solutions to enhance the traceability system in a dairy plant. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook | |
| **Tools, Equipment and Other Requirements** | |
| Recipes, measuring equipment (scales, graduated cylinders, measuring cups), mixing and blending equipment (e.g., ribbon blender, high-shear mixer), a pasteuriser (if not used in Module 1), a homogeniser (optional), flavouring ingredients (e.g., cocoa powder, fruit purees, extracts), sweeteners (e.g., sugar, honey), filling and packaging machines for flavoured milk containers, sensory evaluation forms and scorecards, laboratory testing equipment (same as Module 1), ERP software (for inventory management, production scheduling), a SCADA system (for monitoring and controlling process parameters), a barcode scanner or RFID reader (for traceability), and quality control and production logs (paper or digital). | |

## Module 5: Carryout Post-Production Operations in Dairy Processing
*Mapped to FIC/N2033: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Oversee and perform packaging and labelling operations for various dairy products, ensuring quality and compliance with industry standards.
- Manage the storage and distribution of dairy products, maintaining optimal quality and safety throughout the post-production chain.

| **Duration**: *30:00* | **Duration**: *60:00* |
|---|---|
| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Identify different types of packaging materials used in the dairy industry and their suitability for various dairy products.<br>• Explain the principles of operation for different packaging machines (filling, sealing, labelling).<br>• Describe the principles of food labelling, including mandatory information and regulatory requirements.<br>• Explain the optimal storage conditions for different dairy products to maintain quality and safety.<br>• Describe inventory management techniques (FIFO, FEFO) for efficient tracking and rotation of dairy products.<br>• Explain transportation requirements for dairy products, considering temperature control and handling procedures.<br>• Describe quality control tests relevant to post-production (sensory evaluation, microbiological testing, shelf-life assessment).<br>• Explain root cause analysis techniques to identify the underlying causes of quality deviations.<br>• Describe corrective and preventive actions (CAPA) to address quality issues.<br>• Explain record-keeping systems and documentation practices for traceability and compliance.<br>• Describe the role of ERP systems in managing post-production activities.<br>• Explain the use of SCADA systems for monitoring and controlling critical process parameters.<br>• Describe the application of barcode or RFID | • Select appropriate packaging materials for different dairy products.<br>• Operate packaging machines safely and efficiently.<br>• Inspect packaged products for proper sealing, labelling, and overall quality.<br>• Ensure accurate and compliant labelling of dairy products.<br>• Store dairy products under appropriate conditions to maintain quality.<br>• Implement inventory management systems for efficient tracking and rotation of dairy products.<br>• Maintain cleanliness and hygiene in storage areas.<br>• Prepare dairy products for safe and timely distribution.<br>• Maintain accurate records of distribution.<br>• Conduct sensory evaluations of finished dairy products.<br>• Perform quality control tests on finished products and interpret results.<br>• Identify deviations from product specifications or safety standards.<br>• Investigate the root causes of quality deviations and implement corrective actions.<br>• Maintain detailed records of production batches and quality control data.<br>• Perform routine and preventive maintenance tasks on post-production equipment.<br>• Identify and diagnose common |

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|---|---|
| technology for product traceability and inventory management.<br>• Identify relevant food safety regulations and standards for post-production handling of dairy products.<br>• Explain hygiene and sanitation practices for maintaining a clean and safe post-production environment.<br>• Identify personal protective equipment (PPE) required for safe handling of dairy products and equipment operation.<br>• Explain waste management and disposal procedures in the dairy industry.<br>• Understand the importance of continuous improvement in post-production processes. | equipment malfunctions.<br>• Perform minor repairs on equipment or initiate requests for professional services.<br>• Maintain records of equipment maintenance, repairs, and performance. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Milk tankers, receiving and storage tanks, refrigeration units, platform testing equipment (lactometer, thermometer, alcohol lamp), titration kit, pH meter, cleaning and sanitation supplies, and personal protective equipment (PPE). | |

## Module 6: Practice food safety, GMP and personal hygiene at the workplace

*Mapped to FIC/N9906 v1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Apply personal hygiene and follow Good Manufacturing practices at the workplace.
- Implement Food Safety and pre-requisite programs (PRP) at the workplace

| **Duration**: *05:00* | **Duration**: *10:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Define hazards and risks.<br>• Recall the various types of health and safety equipment available in an organisation and the methods for obtaining them.<br>• Discuss the organisational health and safety policies and procedures<br>• Discuss site-relevant documented procedures for Personal Hygiene and Visitor/ Contractor rules<br>• Explain work instructions at levels of employees inside a food manufacturing site<br>• Ensure timed planning and participation in relevant training and awareness sessions on personal hygiene, GMP, and related topics<br>• Explain the importance of timely medical examination from a prescribed and authorised doctor and comply with the guidelines of Schedule IV as described in Food Safety Standard Authority of India (FSSAI) guidelines<br>• State how to follow a site-relevant documented procedure and area-wise work instructions for Good Manufacturing Practices (GMP) to be followed on the site<br>• List validated Do's & Don'ts inside a food manufacturing firm<br>• State process flow charts, HACCP summary plan and critical process parameters in each and respective areas of the production line<br>• Explain how to identify the material requirements such as manufacturing equipment, Utensils and other processing aids, cleaning chemicals, and cleaning work instructions in all the relevant areas of the manufacturing facility | • Demonstrate the steps to be performed for implementing good manufacturing practices (GMP)<br>• Demonstrate how to follow work instructions at levels of the employee inside a food manufacturing site and ensure that the relevant instructions are well communicated and being followed at the fixed timelines<br>• Show how to fill data in the daily monitoring checklist related to personal hygiene, food safety and GMP<br>• Illustrate process to follow man and materials movement throughout the production facility to restrict unwanted hazards from contaminating the products which are being manufactured in the facility<br>• Show how to tag and number all the equipment, machinery, tools, and other processing aids to keep proper traceability of the product being manufactured and handled at the site.<br>• Demonstrate process of record keeping and documentation such as Daily Monitoring Sheets, Batch Traceability Records, machine records, product parameters, process control parameters, etc. |

| Classroom Aids: |
| --- |
| Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation slides, Participant Handbook, etc. |
| **Tools, Equipment, and Other Requirements** |
| GMP format and guidelines, allergen manual, personal hygiene guidelines, etc. |

## Module 7: Apply food safety practices at the workplace
*Mapped to FIC/N9906 v1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- List the food safety practices at the workplace and the ways to implement them
- Demonstrate the steps to be followed to implement food safety procedures effectively

| **Duration**: *05:00* | **Duration**: *10:00* |
|---|---|
| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • List the various types of health and safety hazards present in the environment.<br>• Discuss the possible causes of risk, hazard or accident at the workplace<br>• Elucidate the standard practices and precautions used to control and prevent risks, hazards and accidents at the workplace<br>• Explain requirements to maintain updated facilities, equipment and tools to minimise the risks associated with the products being handled at the site<br>• State the importance of using protective equipment and clothing for specific tasks and work conditions<br>• Discuss the role of organisational protocols in preventing accidents and hazards<br>• Discuss the significance of various types of hazard and safety signs<br>• Explain FSSAI Schedule IV requirements related to Pest Control, Cleaning and Sanitation, Utilities, Waste Disposal, Prevention of Cross Contamination, allergen management, corrective action, preventive actions, food operation control, etc.<br>• Discuss the relevance of checking critical control points and product parameters.<br>• Explain the importance of record keeping and documentation such as daily monitoring sheets, cleaning sheets, parameters, etc. | • Apply appropriate techniques to deal with hazards safely and appropriately<br>• Perform steps for checking critical control points and product parameters<br>• Show how to record keeping and documentation such as daily monitoring sheets, cleaning sheets, parameters, etc.<br>• Demonstrate appropriate ways to respond promptly and appropriately to an accident or medical emergency.<br>• Perform the steps to be followed during emergency and evacuation procedures. |

| | |
|---|---|
| • Discuss how to report any food safety and GMP issues to the supervisor, if any. | |
| **Classroom Aids:** | |
| Training kit (Trainer guide, Presentations), Whiteboard, Marker, Projector, Laptop, Presentation slides, Participant Handbook, etc. | |
| **Tools, Equipment, and Other Requirements** | |
| Helmet, gloves, rubber mat, ladder, neon tester, leather or asbestos gloves, flameproof aprons, flameproof overalls buttoned to the neck, cuffless (without folds) trousers, reinforced footwear, helmets/hard hats, cap and shoulder covers, ear defenders/plugs, safety boots, knee pads, particle masks, glasses/goggles/visors, hand and face shields, machine guards, residual current Devices, shields, dust sheets, respirator | |

## Module 8: Employability Skills
### *Mapped to DGT/VSQ/N0101, v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Describe the traits of individuals at the workplace
- Demonstrate and apply employability and entrepreneurship skills at the workplace

| **Duration: *20:00*** | **Duration: *40:00*** |
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| **Theory – Key Learning Outcomes** | **Practical – Key Learning Outcomes** |
| • Discuss the importance of Employability Skills in meeting the job requirements.<br>• Explain constitutional values, civic rights, duties, citizenship, responsibility towards society, etc., that are required to be followed to become a responsible citizen.<br>• Discuss 21st century skills.<br>• Display positive attitude, self-motivation, problem-solving, time management skills and a continuous learning mindset in different situations.<br>• Discuss the significance of reporting sexual harassment issues in time<br>• Discuss the significance of using financial products and services safely and securely.<br>• Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws.<br>• Explain the importance of managing expenses, income, and savings.<br>• Discuss the significance of using the internet for browsing and accessing social media platforms safely and securely.<br>• Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges<br>• Differentiate between types of customers<br>• Explain the significance of identifying customer needs and addressing them<br>• Discuss the significance of maintaining | • Show how to practice different environmentally sustainable practices<br>• Use appropriate basic English sentences/phrases while speaking<br>• Demonstrate how to communicate in a well-mannered way with others<br>• Demonstrate working with others in a team<br>• Show how to conduct oneself appropriately with all genders and PwD<br>• Show how to operate digital devices and use the associated applications and features safely and securely<br>• Create a biodata<br>• Use various sources to search and apply for jobs |

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| hygiene and dressing appropriately<br>• Discuss the significance of dressing up neatly and maintaining hygiene for an interview<br>• Discuss how to search and register for apprenticeship opportunities | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook | |
| **Tools, Equipment and Other Requirements** | |
| Computer/laptop. | |

## Module 9: Producing Cheese and Curd
*Mapped to FIC/N2034: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Produce various types of cheese (cheddar, mozzarella, brie) and curd (paneer).
- Monitor and control the cheese ripening process to achieve desired characteristics.
- Apply quality control measures to ensure the production of high-quality cheese and curd.
- Understand the nutritional and culinary significance of cheese and curd.

| **Duration**: *20:00* | **Duration**: *30:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Classify different types of cheese (cheddar, mozzarella, brie) based on their production methods and characteristics.<br>• Explain the role of pasteurisation in cheesemaking and the appropriate temperature-time combinations.<br>• Describe the function of different coagulants (rennet, acid) and their impact on curd formation and cheese texture.<br>• Analyse the significance of curd cutting and cooking in controlling cheese moisture and texture.<br>• Differentiate between dry salting and brining and their effect on cheese flavour and preservation.<br>• Explain the concept of cheese ripening/maturation and the factors influencing it (temperature, humidity, time).<br>• Describe the role of starter and ripening cultures in cheese flavour development.<br>• Understand the sensory attributes of cheese (flavour, aroma, texture, appearance) and their evaluation.<br>• Explain the packaging and labelling requirements for cheese.<br>• Understand the specific steps and variations in curd production (e.g., paneer).<br>• Describe the role of lactic acid bacteria in curd formation and acidification.<br>• Apply the principles of heat treatment and acidification to control curd texture.<br>• Explain the methods of whey separation and curd pressing in curd production.<br>• Discuss the addition of salt and seasonings in curd production. | • Pasteurise milk for cheese and curd production.<br>• Add coagulant and monitor curd formation.<br>• Cut and cook the curd according to the cheese/curd recipe.<br>• Drain whey and press the curd (for cheese).<br>• Salt the cheese using dry salting or brining.<br>• Prepare and maintain a ripening chamber for cheese maturation.<br>• Monitor and document ripening conditions (temperature, humidity).<br>• Perform sensory evaluation of cheese during ripening.<br>• Package and label cheese.<br>• Inoculate milk with a starter culture for curd production.<br>• Monitor curd formation and acidification.<br>• Cut, cook, and drain the curd.<br>• Season the curd with salt and other ingredients.<br>• Package and label curd.<br>• Clean and sanitise equipment used in cheese and curd production.<br>• Conduct quality control tests (pH, moisture) on cheese and curd. |

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| • Identify common defects in cheese and curd production and their prevention.<br>• Explain the quality control measures specific to cheese and curd (pH, moisture, microbial testing).<br>• Understand the storage and distribution requirements for cheese and curd to maintain quality.<br>• Discuss the nutritional value and health benefits of cheese and curd.<br>• Explain the role of cheese and curd in different culinary applications.<br>• Understand the economic aspects of cheese and curd production. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Cheese vats, curd knives/harps, draining tables, cheese moulds, cheesecloth, cheese presses, thermometers, pH meters, ripening chamber, packaging materials, labelling equipment, cleaning and sanitation supplies, and PPE. | |

## Module 10: Producing Lassi and Shrikhand
*Mapped to FIC/N2034: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Produce different types of lassi (sweet, salted, flavoured) and shrikhand with consistent quality.
- Apply food safety and hygiene practices in the production of lassi and shrikhand.
- Evaluate the sensory attributes and quality of lassi and shrikhand.
- Understand lassi and shrikhand's cultural and nutritional significance and cater to market preferences.

| **Duration**: *20:00* | **Duration**: *30:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Differentiate between various types of lassi (sweet, salted, flavoured) and their specific ingredients.<br>• Explain the role of lactic acid bacteria in lassi fermentation and flavour development.<br>• Compare and contrast the fermentation conditions for lassi and yoghurt.<br>• Analyse the impact of water content and blending on lassi consistency and texture.<br>• Describe the addition of salt, spices, fruits, and other flavourings in lassi.<br>• Explain the preparation of chakka (thickened yoghurt) for shrikhand.<br>• Discuss the process of sweetening and flavouring chakka to make shrikhand.<br>• Evaluate the sensory attributes of lassi and shrikhand (flavour, aroma, texture, appearance).<br>• Apply the principles of food safety and hygiene in lassi and shrikhand production.<br>• Understand the packaging and labelling requirements for Lassi and Shrikhand.<br>• Describe the different packaging types for lassi and shrikhand and their impact on shelf life.<br>• Explain the quality control measures specific to lassi and shrikhand (pH, acidity, microbial testing).<br>• Identify common defects in lassi and shrikhand production and implement corrective actions.<br>• Discuss the cultural significance and regional variations of lassi and shrikhand.<br>• Explain the nutritional value and potential health benefits of lassi and shrikhand. | • Pasteurise milk or buttermilk for lassi production.<br>• Inoculate milk/buttermilk with LAB cultures.<br>• Monitor and adjust lassi fermentation (pH, acidity).<br>• Blend fermented milk/buttermilk with water and other ingredients to achieve desired consistency.<br>• Season lassi with salt, spices, fruits, and other flavourings.<br>• Prepare chakka for shrikhand production.<br>• Sweeten and flavour chakka to make shrikhand.<br>• Chill and package Lassi and Shrikhand.<br>• Perform sensory evaluation of lassi and shrikhand.<br>• Conduct quality control tests (pH, acidity) on lassi and shrikhand.<br>• Clean and sanitise equipment used in lassi and shrikhand production.<br>• Identify and address common defects in lassi and shrikhand production.<br>• Experiment with different flavour combinations and variations for lassi and shrikhand.<br>• Package lassi and shrikhand using different types of containers.<br>• Label lassi and shrikhand according to regulatory requirements. |

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| • Analyse market trends and consumer preferences for Lassi and Shrikhand. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Pasteuriser, fermentation tanks, blenders/mixers, cheesecloth or muslin cloth, refrigeration units, packaging materials, labelling equipment, pH meters, thermometers. | |

## Module 11: Equipment Operation and Maintenance in Fermented Dairy Production

*Mapped to FIC/N2034: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Operate and maintain various dairy processing equipment used in fermented dairy production.
- Troubleshoot common equipment problems and implement corrective actions.
- Apply preventive maintenance practices to ensure equipment reliability and longevity.
- Adhere to safety protocols and maintain a safe working environment while handling equipment.

| **Duration**: *20:00* | **Duration**: *30:00* |
|---|---|
| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Identify and classify different types of equipment used in fermented dairy production (fermenters, homogenisers, separators, pasteurisers, etc.).<br>• Understand the operating principles of each type of equipment and their specific functions in the production process.<br>• Explain the importance of standard operating procedures (SOPs) for safe and efficient equipment operation.<br>• Describe the components and functions of Human-Machine Interface (HMI) systems that control and monitor equipment.<br>• Interpret sensor data (temperature, pressure, pH) from equipment to assess performance and detect anomalies.<br>• Understand the principles of preventive maintenance and its importance in equipment longevity and reliability.<br>• Describe the cleaning and sanitation procedures for different types of equipment to prevent contamination.<br>• Identify common equipment malfunctions and troubleshooting techniques.<br>• Explain the importance of calibration for maintaining equipment accuracy.<br>• Understand the safety precautions and protocols for operating and maintaining dairy processing equipment. | • Operate fermenters, homogenisers, separators, pasteurisers, and other dairy processing equipment according to SOPs.<br>• Use HMI systems to monitor and control equipment parameters.<br>• Interpret sensor data and troubleshoot common equipment malfunctions.<br>• Perform routine cleaning and sanitation of equipment.<br>• Conduct preventive maintenance tasks (e.g., lubrication, inspection, cleaning).<br>• Calibrate equipment sensors and controls.<br>• Record equipment performance and maintenance data.<br>• Implement safety procedures while operating and maintaining equipment.<br>• Identify and report equipment issues to supervisors or maintenance personnel.<br>• Participate in training sessions to enhance equipment operation and maintenance skills. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |

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| Fermenters, homogenisers, separators, pasteurisers, storage tanks, pumps, valves, piping, CIP systems, brushes, detergents, lubrication tools, calibration tools, personal protective equipment (PPE), equipment manuals, and maintenance logs. |

## Module 12: Raw Material Management and Cream Separation
*Mapped to FIC/N2035: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Understand and optimise cream separation processes to achieve the desired fat content.
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| **Duration**: 09*:00* | **Duration**: *12:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Explain the principles of centrifugal force and gravity separation in cream separation.<br>• Identify factors influencing cream separation efficiency (fat globule size, temperature, standardisation, homogenisation).<br>• Discuss the differences between batch and continuous cream separation processes. | • Operate a cream separator using the HMI interface to control flow rate and temperature.<br>• Monitor PLC-controlled alarms for deviations from set parameters.<br>• Calibrate cream separator parameters (flow rate, temperature, pressure) using the HMI.<br>• Troubleshoot and address minor operational issues with the cream separator.<br>• Document cream separator performance data using ERP and/or SCADA systems. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Milk quality testing kits, thermometers, hydrometers, milk receiving and storage equipment (tanks, pumps), cream separator, HMI interface, PLC control system, ERP and/or SCADA systems, milk tankers, temperature data loggers, cleaning and sanitation supplies. | |

## Module 13: Produce Butter & Ghee
*Mapped to FIC/N2035: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Master butter-making techniques to produce high-quality butter, including churning, washing, and working.
- Understand the principles of ghee production and apply safe practices for its manufacture.
- Operate and control butter churns and other butter and ghee processing equipment.
- Apply quality control measures to ensure the production of safe and consistent butter and ghee products.

| **Duration**: 09*:00* | **Duration**: *14:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Explain the steps in butter-making (churning, washing, working) and their importance for quality.<br>• Describe the differences between sweet cream butter and cultured butter, including culturing techniques.<br>• Discuss the role of salting in butter production for flavor and preservation.<br>• Explain the principles of ghee production, including clarification and removal of milk solids.<br>• Identify the factors influencing butter and ghee yield (churning efficiency, fat losses).<br>• Describe the sensory attributes of high-quality butter and ghee (flavor, aroma, texture, appearance).<br>• Discuss the different types of butter and ghee available in the market (salted, unsalted, flavored).<br>• Explain the importance of proper packaging and labeling for butter and ghee products.<br>• Describe the optimal storage conditions for butter and ghee to maintain quality and extend shelf life.<br>• Explain the importance of raw material inspection and testing in butter production.<br>• Describe the process of milk filtration and the purpose of removing sediment.<br>• Explain the purpose and methods of cream pasteurization in butter-making.<br>• Discuss the importance of aging cream and the factors controlling it (time, temperature).<br>• Explain the role of buttermilk removal and butter washing in achieving desired quality.<br>• Describe the process of ghee clarification and | • Inspect and test raw materials (milk, cream) for butter production.<br>• Filter milk to remove sediment before cream separation.<br>• Separate cream from milk using a separator, adjusting speed as needed.<br>• Transfer cream to the holding tank and stir for consistency.<br>• Test buttercream composition following quality standards.<br>• Pasteurize cream using controlled steam heating.<br>• Age pasteurized cream under controlled conditions.<br>• Check cream quality and weight before churning.<br>• Operate a churner, adjusting speed and venting until butter forms.<br>• Separate and remove buttermilk from the churner.<br>• Wash butter in the churner with chlorinated water.<br>• Measure and add salt or salt solution to the churner for salted butter production.<br>• Adjust churner settings to achieve the desired butter thickness and texture.<br>• Extrude butter from the churner or transfer it to the clarifying tank.<br>• Sample and test the final product (butter or ghee) for quality attributes.<br>• Use steam to melt butter and remove moisture for ghee production.<br>• Pump melted butter into the ghee boiler and control stirrer speed and |

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| the factors affecting its quality (temperature, time). | temperature.<br>• Position strainers and transfer ghee to the receiving tank.<br>• Adjust the holding tank temperature to cool the ghee. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Butter churns, butter workers, ghee-making equipment, PLC control system, sensors (temperature, texture, pH), HMI displays, packaging materials (wrappers, containers), labelling equipment, storage facilities (refrigeration), cleaning and sanitation supplies, sensory evaluation tools, fat content determination equipment. | |

## Module 14: Produce Different Types of Cream
*Mapped to FIC/N2035: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Understand the scientific principles and processes involved in producing various cream types.
- Master the techniques for cream separation, standardisation, pasteurisation, and homogenisation.
- Produce different cream varieties, including light, whipping, heavy, half-and-half, sour cream, crème fraîche, clotted cream, and buttermilk.

| **Duration**: *09:00* | **Duration**: *14:00* |
|---|---|
| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Explain the scientific principles of cream separation, including the role of fat globules and the influence of temperature and centrifugation.<br>• Describe the process of cream standardization, adjusting fat content to meet specific product requirements.<br>• Discuss the purposes of pasteurization and homogenization in cream production, detailing the equipment used and process parameters.<br>• Explain the differences between various cream types based on fat content and production methods.<br>• Describe the role of lactic acid bacteria cultures in producing sour cream, crème fraîche, and cultured buttermilk.<br>• Explain the traditional method for producing clotted cream by heating and slowly cooling milk.<br>• Discuss quality control tests for cream products, including fat content determination, acidity measurement, and microbiological analysis.<br>• Describe appropriate packaging materials for different cream products, considering their characteristics and shelf-life requirements.<br>• Explain proper labeling of cream products, including product name, ingredients, nutritional information, batch number, and dates.<br>• Discuss the optimal storage conditions for cream products to maintain quality and prevent spoilage.<br>• Explain the importance of traceability systems in cream production for product safety and recall capability. (Added)<br>• Identify potential quality defects in cream | • Receive and inspect raw materials for cream production.<br>• Ensure quality specifications and documentation compliance.<br>• Perform the process of cream standardization to meet specific product requirements.<br>• Operate cream separators and standardizing equipment safely and efficiently.<br>• Operate and monitor pasteurization and homogenization processes.<br>• Produce light cream by separating and standardizing milk.<br>• Produce whipping cream and ensure it whips to the desired volume and stability.<br>• Produce heavy cream suitable for thickening sauces and enriching desserts.<br>• Produce half-and-half by blending milk and cream in appropriate proportions.<br>• Ferment cream (light or heavy) using specific cultures to produce sour cream or crème fraîche.<br>• Heat and slowly cool full-fat milk in shallow pans to form a thick layer of clotted cream.<br>• Ferment skimmed or low-fat milk to produce cultured buttermilk with the desired tangy flavor and thick consistency.<br>• Conduct quality control tests on finished cream products to assess fat content, acidity, and microbiological safety. (Added)<br>• Select and operate packaging machines |

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| products (e.g., off-flavors, separation, spoilage) and their causes.<br>• Discuss troubleshooting measures to address common production issues. | (filling, sealing, labeling) for different cream products.<br>• Label cream products accurately, complying with relevant regulations.<br>• Store cream products at appropriate temperatures to maintain quality and ensure food safety.<br>• Implement and maintain a traceability system for cream products.<br>• Troubleshoot common production issues and implement corrective actions.<br>• Maintain proper hygiene and sanitation practices during all stages of cream production. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Cream separators, standardising equipment, pasteurisers, homogenisers, fermentation tanks, clotted cream pans, milk and cream testing equipment (fat content, acidity), packaging machines (filling, sealing, labelling), refrigeration units, microbiological testing equipment, cleaning and sanitation supplies, personal protective equipment (PPE). | |

## Module 15: Produce Khoa and Channa
*Mapped to FIC/N2035: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Understand the traditional and industrial methods for producing Khoa and Channa.
- Identify the factors that influence the quality and texture of Khoa and Channa.
- Produce different types of Khoa and Channa with varying moisture content and texture.
- Implement hygiene and sanitation practices during Khoa and Channa production.

| **Duration**: 09*:00* | **Duration**: *14:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Describe the traditional method of Khoa production, involving continuous stirring and evaporation in an open pan.<br>• Explain the industrial methods for Khoa production, including continuous Khoa-making machines.<br>• Identify factors influencing Khoa quality and texture (milk composition, heating temperature, stirring, equipment).<br>• Differentiate between various types of Khoa based on moisture content and texture (Pindi, Dhap, Danedar).<br>• Describe the process of Channa production, including acid coagulation of milk and curd handling techniques.<br>• Explain the role of acidulants (citric acid, lactic acid) in Channa production and their selection criteria.<br>• Identify factors affecting Channa yield and quality (milk quality, acidulant type, coagulation temperature).<br>• Differentiate between different types of Channa (soft, hard) based on texture and moisture content.<br>• Explain the principles of hygiene and sanitation in Khoa and Channa production, emphasizing clean equipment, utensils, work surfaces, and personal hygiene practices.<br>• Describe the importance of monitoring and controlling critical process parameters (temperature, acidity) during production.<br>• Discuss appropriate packaging materials for Khoa and Channa to maintain freshness and prevent spoilage.<br>• Explain the role of automation in Khoa and Channa production, using continuous machines for improved efficiency.<br>• Identify potential quality defects in Khoa and | • Inspect and test raw materials for Khoa/Channa production.<br>• Ensure that quality specifications are met and documentation is in order.<br>• Operate and control equipment for Khoa production, such as the Karahi (traditional method) or the steam-jacketed kettle (industrial method), ensuring proper heating and stirring.<br>• Stir and scrape Khoa to achieve the desired texture and prevent burning.<br>• Adjust the heat source and cooking time based on the type of milk and desired Khoa consistency.<br>• Add coagulant (acid or rennet) to milk in the correct proportion for Channa formation.<br>• Control the Channa coagulation process by adjusting the temperature, acidity, and rennet concentration.<br>• Separate the Channa curds from the whey using suitable techniques, ensuring efficient drainage.<br>• Knead and press the Channa curds to remove excess whey and achieve the desired texture.<br>• Identify and address common production issues, such as scorching, uneven coagulation, or undesirable flavors.<br>• Implement corrective actions to maintain product quality and consistency.<br>• Use automated equipment (continuous Khoa/Channa makers) for improved efficiency and consistency. (Added) |

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| Channa (e.g., off-flavors, discoloration, contamination) and their causes.<br>• Discuss troubleshooting measures to address common production problems. | |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Open pans, Khoa-making machines, Channa-making systems, stirrers, acidulants (citric acid, lactic acid), thermometers, pH meters, milk and curd handling equipment, packaging materials, labelling equipment, storage facilities, cleaning and sanitation supplies, personal protective equipment (PPE). | |

## Module 16: Master Ice Cream Production: From Mix to Delight
*Mapped to FIC/N2036: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Produce high-quality ice cream with desired flavour, texture, and consistency.
- Operate and maintain ice cream production equipment effectively.
- Implement quality control measures to ensure ice cream safety and consistency.
- Troubleshoot and resolve common issues in ice cream production.
- Comply with legal and regulatory requirements for ice cream production and labelling.

| **Duration**: *18:00* | **Duration**: *27:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Describe the standard composition of an ice cream mix (milk, cream, sugar, stabilizers, emulsifiers).<br>• Explain the role of each ingredient in ice cream's texture, flavor, and stability.<br>• Discuss the different types of sweeteners used in ice cream and their impact on the final product.<br>• Explain the pasteurization process for ice cream mix and its importance in food safety.<br>• Describe the homogenization process and its role in creating a smooth, creamy texture.<br>• Explain the purpose of aging the ice cream mix and the factors influencing aging time.<br>• Discuss the principles of freezing ice cream, including ice crystal formation and overrun control.<br>• Describe the different types of freezers used in ice cream production (batch and continuous).<br>• Explain the importance of hardening and the role of hardening tunnels.<br>• Discuss the different types of flavorings and variegates used in ice cream.<br>• Describe the appropriate packaging and labeling requirements for ice cream.<br>• Explain the storage conditions for ice cream to maintain quality and safety.<br>• Discuss common defects in ice cream (iciness, shrinkage, sandiness) and their causes.<br>• Explain the importance of quality control measures in ice cream production.<br>• Describe the legal and regulatory requirements for ice cream production and labeling. | • Receive raw material for ice cream production, verify and inspect delivery, visually inspect the material and measure relevant parameters, sample and test.<br>• Measure and transfer liquid ingredients into the mixing tank following SOPs.<br>• Adjust the agitator speed to mix liquid ingredients.<br>• Weigh, pre-blend, and add dry ingredients to the mixing tank.<br>• Mix dry and wet ingredients to create the ice cream mix.<br>• Pump the ice cream mix into the pasteurization tank.<br>• Heat the mix using steam, controlling pressure and agitator speed.<br>• Transfer the pasteurized mix to the homogenizer and homogenize at high pressure.<br>• Cool the homogenized mix using heat exchangers.<br>• Transfer the cooled mix to a refrigerated storage tank for aging.<br>• Measure and add flavor and color to the aged mix.<br>• Pass the flavored mix into the dynamic freezer and freeze to the required temperature.<br>• Whip the ice cream mix in the freezer to incorporate air and achieve a smooth texture.<br>• Check the quality of the ice cream through physical parameters.<br>• Prepare coating material for ice cream.<br>• Prepare center-filling material. |

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| | • Fill soft-serve ice cream directly into cones or containers.<br>• Inject center filling material into ice cream.<br>• Transfer packaged ice cream to the hardening room for hardening.<br>• Transfer hardened ice cream to frozen storage.<br>• Fill ice cream molds, insert sticks, harden, and coat (for coated ice creams).<br>• Extrude ice cream into desired shapes, insert sticks, and cut into portions.<br>• Deposit ice cream onto conveyor belts for hardening in tunnels or spiral freezers.<br>• Control conveyor speed, depositing machine speed, and hardening tunnel/freezer temperature.. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Milk, cream, sugar, stabilisers, emulsifiers, flavourings, variegates, pasteuriser, homogeniser, ageing tank, batch or continuous freezer, hardening tunnel, filling machine, packaging materials, labelling equipment, thermometers, refractometers, pH meters, microbiological testing kits, cleaning and sanitation supplies, personal protective equipment (PPE). | |

## Module 17: Produce Frozen Yogurt
*Mapped to FIC/N2036: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Produce high-quality frozen yoghurt, with desired characteristics.
- Understand the unique production requirements and challenges of each product.
- Implement quality control measures to ensure the safety and consistency of each product.
- Troubleshoot and resolve common production issues specific to each product.
- Comply with regulatory guidelines and labelling requirements for frozen yoghurt

| **Duration**: *18:00* | **Duration**: *27:00* |
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| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Describe the unique characteristics of frozen yoghurt<br>• Explain the role of live and active cultures in frozen yoghurt and their impact on flavor, texture, and potential health benefits.<br>• Discuss the selection criteria for yoghurt cultures in frozen yoghurt production, considering factors like acid production, flavor development, and texture enhancement.<br>• Explain the importance of controlling pasteurization temperature and time in frozen yoghurt to preserve culture viability and product quality.<br>• Describe the incubation process for frozen yoghurt mix and the factors influencing fermentation time and temperature.<br>• Explain the differences in fat content and milk solids between ice cream and frozen yoghurt.<br>• Discuss the role of stabilizers and emulsifiers in frozen dessert formulations, emphasizing their impact on texture, overrun, and freeze-thaw stability.<br>• Explain the significance of controlling overrun in frozen desserts, highlighting its effect on texture, cost, and consumer perception.<br>• Describe the freezing process for different frozen desserts, considering factors like ice crystal size, agitation, and freezing rate.<br>• Discuss appropriate packaging and labeling requirements for frozen yoghurt<br>• Explain the storage conditions for frozen desserts to maintain quality and prevent spoilage. | • Receive, inspect, and test raw materials (milk, cream, etc.) for frozen dessert production<br>• Select high-quality yoghurt cultures specifically formulated for frozen yoghurt production.<br>• Prepare the frozen yoghurt mix by accurately measuring and combining ingredients.<br>• Pasteurize the frozen yoghurt mix at a lower temperature and shorter duration to preserve the viability of probiotic cultures and maintain the desired flavor and texture.<br>• Cool the mix to the appropriate incubation temperature.<br>• Incubate the inoculated mix for the specified time to allow fermentation to develop the characteristic tangy flavor and acidity.<br>• Cool the fermented mix further to a temperature suitable for freezing.<br>• Freeze the mix in a continuous or batch freezer, controlling overrun and ice crystal size to achieve the desired consistency and texture.<br>• Add flavorings and variegates to the frozen yoghurt as per SOPs.<br>• Cool the mix to the desired temperature before freezing to facilitate proper ice crystal formation and improve flavor development.<br>• Freeze the mix in a continuous or batch freezer, controlling the overrun and ice crystal size to achieve the desired consistency and texture, typically |

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| | lighter and less creamy than ice cream. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Milk, cream, sugar, stabilisers, emulsifiers, yoghurt cultures, egg yolks, flavourings, variegates, pasteuriser, homogeniser, ageing tank, batch or continuous freezer, hardening tunnel, filling machine, packaging materials, labelling equipment, thermometers, refractometers, pH meters, microbiological testing kits, cleaning and sanitation supplies, personal protective equipment (PPE). | |

## Module 18: Gain Expertise in Equipment Operation and Maintenance in Condensed and Dried Dairy Production
*Mapped to FIC/N2037: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Safely and effectively operate all equipment used in condensed and dried dairy processing.
- Implement preventive maintenance schedules to maximise equipment performance and longevity.
- Identify and troubleshoot common equipment malfunctions, taking appropriate corrective actions.
- Maintain a safe working environment by following safety protocols and using PPE.
- Ensure equipment compliance with legal requirements and safety standards through regular audits and inspections.

| **Duration**: *18:00* | **Duration**: *27:00* |
|---|---|
| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Classify different types of raw milk and by-products used in condensed and dried dairy production.<br>• Explain quality parameters for raw milk (fat, SNF, SCC, microbiological quality).<br>• Describe supplier evaluation criteria and contract negotiation processes.<br>• Discuss the importance of temperature control and storage conditions for raw milk.<br>• Explain the FIFO principle for milk inventory rotation.<br>• Describe the requirements for milk tanker hygiene and transportation.<br>• Outline quality assessment procedures for by-products (whey, casein, ghee residue).<br>• Explain the legal and regulatory requirements for raw milk quality in the dairy industry.<br>• Discuss the importance of traceability and documentation in raw material management.<br>• Describe the potential consequences of using substandard raw materials.<br>• Explain the role of quality control in ensuring the safety and quality of finished products.<br>• Discuss common adulterants found in raw milk and detection methods.<br>• Explain the impact of raw material quality on the yield and efficiency of production.<br>• Describe the importance of regular supplier audits and quality monitoring programs.<br>• Discuss the environmental considerations in raw milk sourcing and transportation. | • Evaluate raw milk suppliers based on quality, price, and reliability.<br>• Negotiate and establish contracts with approved suppliers.<br>• Assess the quality of incoming raw milk and by-products against defined standards.<br>• Follow proper procedures for receiving and sampling raw milk.<br>• Maintain cleanliness and sanitation in milk receiving and storage areas.<br>• Implement temperature control measures and monitor storage conditions for raw milk.<br>• Employ FIFO inventory rotation for raw milk.<br>• Segregate milk batches based on supplier, delivery date, or quality.<br>• Ensure milk tankers are clean, sanitized, and sealed for transport and monitor milk temperature during transportation.<br>• Verify delivery documentation upon arrival.<br>• Identify and report deviations in raw milk quality and implement corrective actions for quality issues in raw materials. |

| Classroom Aids: |
| --- |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. |
| **Tools, Equipment and Other Requirements** |
| Evaporators, spray dryers, roller dryers, vacuum pans, homogenizers, separators, heat exchangers, packaging machines, CIP systems, cleaning and sanitation supplies, lubricants, tools for inspection and repair, personal protective equipment (PPE), maintenance logs, SOPs, manufacturer manuals. |

## Module 19: Produce Sweetened Condensed Milk
*Mapped to FIC/N2037: v 1.0*

**Terminal Outcomes:** After the successful completion of this module, the participant will be able to:

- Produce various types of condensed milk (sweetened and evaporated milk), meeting quality standards.
- Operate and maintain equipment used in condensed milk production.
- Implement quality control measures to ensure product consistency and safety.
- Apply appropriate packaging and labelling techniques for condensed milk.
- Understand and address common challenges and defects in condensed milk production.

| **Duration**: *18:00* | **Duration**: *27:00* |
|---|---|
| **Theory–Key Learning Outcomes** | **Practical–Key Learning Outcomes** |
| • Differentiate between the types of condensed milk (sweetened and evaporated milk).<br>• Explain the process of milk standardization and its importance in achieving the desired composition.<br>• Discuss the principles of pre-heating milk and its benefits in condensed milk production (inactivation of enzymes, improved heat stability).<br>• Describe the operation of vacuum evaporators and their role in concentrating milk.<br>• Explain the calculation methods for determining sugar addition in sweetened condensed milk.<br>• Discuss the importance of controlled sugar addition to prevent crystallization.<br>• Outline the homogenization process in condensed milk and its effect on product stability.<br>• Describe the different packaging options for condensed milk (cans, tubes, bulk) and their suitability for various applications.<br>• Explain the importance of properly labelling condensed milk products, including regulatory compliance.<br>• Discuss the principles of aseptic packaging and its advantages in preserving product quality and extending shelf life.<br>• Explain the role of quality control tests in ensuring the consistency and safety of condensed milk.<br>• Describe the common defects in condensed milk (e.g., browning, age gelation, sandiness) and their causes. | • Standardize milk for fat and SNF content as per the desired condensed milk type (sweetened and evaporated milk).<br>• Preheat milk to the recommended temperature.<br>• Operate a vacuum evaporator to concentrate milk to the desired total solids level.<br>• Calculate and add the correct amount of sugar for sweetened condensed milk.<br>• Homogenize condensed milk to prevent fat separation.<br>• Cool condensed milk to the appropriate temperature for packaging.<br>• Package condensed milk in cans, tubes, or bulk containers.<br>• Apply proper labelling to condensed milk products.<br>• Implement sterile filling techniques for aseptic packaging.<br>• Conduct quality control tests on condensed milk, including sensory evaluation, total solids determination, and microbiological testing.<br>• Identify and troubleshoot common defects in condensed milk.<br>• Maintain accurate records of production parameters and quality control data.<br>• Follow good manufacturing practices (GMP) and hygiene standards during production. |

| | |
|---|---|
| • Discuss the factors affecting the shelf life of condensed milk (e.g., sugar content, storage temperature, packaging).<br>• Explain the impact of processing parameters (e.g., evaporation temperature, time) on the final product characteristics.<br>• Discuss the various applications of condensed milk in the food industry (bakery, confectionery, desserts).<br>• Explain the importance of properly storing and handling condensed milk to maintain its quality.<br>• Describe the principles of food safety and hygiene in condensed milk production.<br>• Discuss the potential allergens in condensed milk and the need for accurate labelling. | • Clean and sanitize equipment and work surfaces after production.<br>• Properly store condensed milk under recommended conditions. |
| **Classroom Aids:** | |
| Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook. | |
| **Tools, Equipment and Other Requirements** | |
| Raw milk, sugar, vacuum evaporator, homogenizer, cooling system, canning/filling machine, labelling equipment, quality testing instruments (refractometer, hydrometer, etc.), cleaning and sanitation supplies, personal protective equipment (PPE), production logs, and quality control records. | |

## Module 20: On the Job Training

*Mapped to FIC/Q2001: Dairy Product Processor*

| Mandatory Duration: 60:00 | Recommended Duration: 00:00 |
|---|---|
| **Location: On-Site** | |

- Accurately assess and select high-quality raw milk from reliable suppliers.
- Develop and implement effective production plans for various milk types.
- Safely and efficiently operate and maintain milk processing equipment.
- Maintain strict hygiene and sanitation standards in the production area.
- Produce toned, fat, low-fat milk that meets quality and safety standards.
- Produce flavoured milk with consistent taste, texture, and appearance.
- Implement quality assurance measures and maintain accurate production records.
- Maintain impeccable personal hygiene and adhere to Good Manufacturing Practices (GMP).
- Implement and monitor workplace food safety and prerequisite programs (PRPs).
- Identify and address potential food safety hazards in storage and production areas.
- Follow proper procedures for handling raw materials, packaging materials, and finished products.
- Conduct regular inspections and audits to ensure compliance with food safety regulations.
- Maintain accurate records of food safety practices and corrective actions.
- Demonstrate effective communication skills, both verbal and written.
- Work collaboratively in a team environment, respecting diversity and inclusion.
- Apply basic English language skills in workplace communication.
- Understand and uphold constitutional values and civic responsibilities.
- Develop 21st-century skills, such as problem-solving, critical thinking, and adaptability.
- Demonstrate financial and legal literacy in personal and professional contexts.
- Utilize essential digital skills for communication, information gathering, and problem-solving.
- Understand the principles of entrepreneurship and customer service.
- Prepare for job applications and interviews, including creating a resume and researching potential employers.
- Select and manage high-quality raw milk for fermented dairy production.
- Understand and apply the principles of fermentation, including the role of microorganisms and starter cultures.
- Operate and maintain equipment used in fermented dairy production, such as fermenters, homogenizers, and separators.
- Produce various fermented dairy products, such as yoghurt, cheese, lassi, and shrikhand, following specific production processes and quality standards.
- Implement quality assurance measures and maintain accurate production and quality control data records.
- Select and manage high-quality raw milk for fat-based dairy production.
- Perform cream separation efficiently and accurately.
- Produce butter and ghee using traditional and modern techniques, ensuring product quality and safety.
- Produce various types of cream, including light, whipping, heavy, half-and-half, sour cream, crème fraîche, and clotted cream.
- Produce khoa and channa using appropriate methods and ingredients.

- Operate and maintain equipment used in fat-based dairy production, such as butter churns, cream separators, and khoa-making machines.
- Implement quality assurance measures and maintain accurate production and quality control data records.
- Select and manage high-quality raw materials for frozen dairy production.
- Operate and maintain equipment used in frozen dairy production, such as freezers, pasteurizers, and homogenizers.
- Implement quality assurance measures and maintain accurate production and quality control data records.
- Select and manage high-quality raw milk for condensed and dried dairy production.
- Operate and maintain equipment used in condensed and dried dairy processing, such as evaporators, spray dryers, and roller dryers.
- Produce condensed milk (sweetened and unsweetened) and various types of milk powder (whole milk powder, skim milk powder, instant milk powder).
- Produce infant formula following strict quality and safety standards.
- Implement quality assurance measures and maintain accurate records of production and quality control data.

# Annexure

| Trainer Prerequisites | | | | | | |
|---|---|---|---|---|---|---|
| **Minimum Educational Qualification** | **Specialisation** | **Relevant Industry Experience** | | **Training Experience** | | **Remarks** |
| | | ***Years*** | ***Specialisation*** | ***Years*** | ***Specialisation*** | |
| Diploma | Dairy Technology/Food Tech/Food Engineering/Hotel Management | 4 | hand on experience in a Dairy industry | | Training of of dairy processing operators | |
| B.Sc./B.Tech/BE | Dairy Technology/food science/home science/food technology or in related subjects | 2 | hand on experience in a Dairy industry<br><br>hand on | | Training of of dairy processing operators | |
| M.Sc./M.Tech/ME | Dairy Technology/food science/home science/food technology or in related subjects | 1 | hand on experience in a Dairy industry | | Training of of dairy processing operators | |

| Trainer Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| Certified for Job Role: "Butter and Ghee Processing Operator" mapped to QP: "FIC/Q2003, v3.0". Minimum accepted score is 80%. | Recommended that the Trainer is certified for the Job Role: "Trainer" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2601", V.2. Minimum accepted SCORE IS 80 % as per SSC guidelines. |

## Assessor Requirements

| Assessor Prerequisites | | | | | | |
|---|---|---|---|---|---|---|
| **Minimum Educational Qualification** | **Specialisation** | **Relevant Industry Experience** | | **Training/Assessment Experience** | | **Remarks** |
| | | ***Years*** | ***Specialisation*** | ***Years*** | ***Specialisation*** | |
| Diploma | Dairy Technology /Food Tech/Food Engineering/Hotel Management | 5 | hands-on experience in theDairy industry | 1 | Assessment of dairy processing operators | |
| B.Sc./B.Tech/BE | Dairy Technology or Food Engineering | 3 | hands-on experience in theDairy industry | 1 | Assessment of dairy processing operators | |
| M.Sc./M.Tech/ME | Dairy Technology or Food Engineering | 2 | hands-on experience in theDairy industry | 1 | Assessment of dairy processing operators | |

| Assessor Certification | |
|---|---|
| **Domain Certification** | **Platform Certification** |
| Certified for Job Role: "Butter and Ghee Processing Operator" mapped to QP: "FIC/Q2003, v3.0". Minimum accepted score is 80%. | Recommended that the Assessor is certified for the Job Role: "Assessor" (VET & SKILLS), mapped to the Qualification Pack: "MEP/Q2701", V-2. The minimum accepted SCORE IS 80 %, as per SSC guidelines. |

## Assessment Guidelines and Assessment Weightage

### Assessment Guidelines

1. The Sector Skill Council will create criteria for assessment for each Qualification Pack. Each Element/ Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each Element/ PC.
2. The assessment for the theory part will be based on a knowledge bank of questions created by the SSC.
3. Assessment will be conducted for all compulsory NOS and, where applicable, on the selected elective/option NOS/set of NOS.
4. Individual assessment agencies will create unique question papers for the theory part for each candidate at each examination/training centre (as per the assessment criteria below).
5. Based on these criteria, individual assessment agencies will create unique evaluations for skill practicals for every student at each examination/ training centre.
6. To pass the Qualification Pack assessment, every trainee should score the Recommended Pass % aggregate for the QP.
7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

**Minimum Aggregate Passing % at QP Level: 70**

(**Please note**: Every Trainee should score a minimum aggregate passing percentage as specified above to successfully clear the Qualification Pack assessment.)

## Assessment Weightage

### Compulsory NOS

| National Occupational Standards | Theory Marks | Practical Marks | Project Marks | Viva Marks | Total Marks | Weightage |
|---|---|---|---|---|---|---|
| FIC/N9026: Prepare for Production Planning and Inventory Control | 25 | 60 | - | 15 | 100 | 30 |
| FIC/N2015: Produce Ice Cream | 27 | 48 | - | 25 | 100 | 45 |
| FIC/N9906: Apply Food Safety Guidelines in Food Processing | 30 | 60 | - | 10 | 100 | 20 |
| DGT/VSQ/N0101.Employability Skills (30 Hours) | 20 | 30 | 0 | 0 | 50 | 5 |
| **Total** | **102** | **198** | **0** | **50** | **350** | **100** |

## Glossary

| Term | Description |
|---|---|
| **Declarative Knowledge** | Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem. |
| **Key Learning Outcome** | The key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. Aset of key learning outcomes will make up the training outcomes. Training<br>outcome is specified in terms of knowledge, understanding (theory) and skills (practical application). |
| **OJT (M)** | On-the-job training (Mandatory): trainees are mandated to complete specified hours of training on-site |
| **OJT (R)** | On-the-job training (Recommended): trainees are recommended the specified hours of training on-site. |
| **Procedural Knowledge** | Procedural knowledge addresses how to do something or how to perform a task. It is the ability to work or produce a tangible work output by applying cognitive, affective or psychomotor skills. |
| **Training Outcome** | Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**. |
| **Terminal Outcome** | Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes helps to achieve the training outcome. |

## Acronyms and Abbreviations

| Term | Description |
|---|---|
| **QP** | Qualification Pack |
| **NSQF** | National Skills Qualification Framework |
| **NSQC** | National Skills Qualification Committee |
| **NOS** | National Occupational Standards |
| **FIFO** | First In, First Out |
| **FEFO** | First Expire First Out |
| **GMP** | Good Manufacturing Practices |
| **GHP** | Good Hygiene Practices |
| **CPR** | Cardiopulmonary Resuscitation |