****

**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**DAIRY PLANT MANAGEMENT**

**LEVEL 4**

 

 TVET CDACC

 P.O. BOX 15745-00100

 NAIROBI

First published 2019

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement Kenya’s development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this Curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Agriculture sector’s growth and sustainable development.

**PRINCIPAL SECRETARY, VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need toreform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Dairy Sector Skills Advisory Committee (SSAC), German International Cooperation and Ministry of Agriculture, Livestock and Fisheries have developed this curriculum. TVET CDACC in conjunction with Micro Enterprises Support Programme Trust (MESPT) have reviewed this curriculum and incorporated Food Safety.

This curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Dairy SSAC, expert workers and all those who participated in the development and review of this curriculum.

**Prof. CHARLES M. M. ONDIEKI, PhD, FIET (K), Con. Eng. Tech.**

**CHAIRMAN, TVET CDACC**

# ACKNOWLEDGEMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support was received from various organizations.

I appreciate NEPAD Planning and Coordinating Agency (NPCA) of the Africa Union Commission and German Ministry of Economic Cooperation and Development (BMZ) through its implementing agency German International Cooperation (GIZ) GmbH which enabled the development of this curriculum through the CAADP ATVET project.

I also appreciate the office of the National Coordinator of GIZ CAADP ATVET Project which was instrumental in the cooperation between the project team, Ministry of Agriculture, Livestock and Fisheries (MoALF) and Ministry of Education.

Much gratitude goes to Micro Enterprises Support Program Trust (MESPT) who initiated the review process and the incorporation of Food Safety in the Curriculum. I acknowledge the Danish International Development Agency (DANIDA) and the European Union (EU) who sponsored the review process.

I recognize with appreciation the role of the Dairy and Food Safety Sector Skills Advisory Committee (SSAC) in ensuring that competencies required by the industry are addressed in the curriculum. I also thank all stakeholders in the Agriculture sector for their valuable input and all those who participated in the process of developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that workers in Dairy Plant Management will acquire competencies that will enable them to perform their work more efficiently.

**Dr. LAWRENCE GUANTAI M’ITONGA, PhD**

**COUNCIL SECRETARY/CEO**

**TVET CDACC**ACRONYMS

ATVET : Agricultural Technical and Vocational Education and Training

BC : Basic Competency

CAADP : Comprehensive Africa Agricultural Development Programme

CBET : Competency Based Education and Training

CDACC : Curriculum Development Assessment and Certification Council

CR : Core Competency

CU : Curriculum

DANIDA Danish International Development Agency

EMCA : Environmental Management and Coordination Act

GAP : Good Agricultural Practices

GIZ : German International Cooperation

DA : Dairy Sector

ICT : Information Communication Technology

IPM : Integrated Pest Management

KCSE : Kenya Certificate of Secondary Education

KDB : Kenya Dairy Board

KNQA : Kenya National Qualifications Authority

MESPT Micro Enterprises Support Programme Trust

MoALF : Ministry of Agriculture Livestock and Fisheries

MoE : Ministry of Education

NEMA : National Environmental Management Authority

PM : Plant Management

OS : Occupational Standard

OSHA : Occupation Safety and Health Act

OSHS : Occupation Safety and Health Standards

PPE : Personal Protective Equipment

SSAC : Sector Skills Advisory Committee

TVET : Technical and Vocational Education and Training

WARMA : Water Resources Management Authority

**KEY TO UNIT CODE**

 **DA/CU/PM/BC/01/4**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

# **COURSE OVERVIEW**

This course is designed to equip an individual with competencies for processing activities in a dairy plant. It entails operating the milk chilling equipment; operating fluid milk processing equipment; making fermented milk, cheese, fat based, and concentrated milk products.

This course consists of the following basic and core units of learning:

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factors** |
| DA/CU/PM/BC/01/4/B | Communication skills | 20 | 2 |
| DA/CU/PM/BC/02/4/B | Numeracy skills | 25 | 2.5 |
| DA/CU/PM/BC/03/4/B | Digital literacy | 35 | 3.5 |
| DA/CU/PM/BC/04/4/B | Entrepreneurial skills | 60 | 6 |
| DA/CU/PM/BC/05/4/B | Employability skills | 30 | 3 |
| DA/CU/PM/BC/06/4/B | Environmental literacy | 20 | 2 |
| DA/CU/PM/BC/07/4/B | Occupational safety and health practices | 20 | 2 |
| **Total** | **210** | **21** |

**Core Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credit Factors** |
| DA/CU/PM/CR/01/4/B | Raw milk chilling | 48 | 4.8 |
| DA/CU/PM/CR/02/4/B | Fluid milk products processing | 48 | 4.8 |
| DA/CU/PM/CR/03/4/B | Fermented milk products processing | 96 | 9.6 |
| DA/CU/PM/CR/04/4/B | Fat based milk products processing | 48 | 4.8 |
| DA/CU/PM/CR/05/4/B | Cheese production  | 96 | 9.6 |
|  | Industrial Attachment | 300 | 30 |
| **Total**  | **636** | **63.6** |
| **Grand Total** | **846** | **84.6** |

The total duration of the course for an average trainee is 866 hours which is equivalent to 28 weeks at 30 hours of learning per week, plus 12 weeks industrial attachment.

**Entry Requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Secondary Education (KCSE) mean grade E.

**Or**

1. Equivalent qualification as determined by Kenya National Qualifications Authority (KNQA)

**Industrial attachment**

An individual enrolled in this course will undergo 12 weeks industrial attachment at a horticultural nursery and an established fruit mother block. An individual enrolled in one of the core units of learning will undergo 2 weeks industrial attachment.

**Assessment**

The course will be assessed at two levels:

1. **Internal assessment**: conducted continuously by the trainer (internal assessor) who is monitored by an accredited internal verifier.
2. **External assessment:** conducted by an accredited external assessor who is monitored by an accredited external verifier.

The assessors and verifiers are accredited by TVET CDACC which also coordinates external assessment.

**Certification**

An individual will be awarded a Record of Achievement on demonstration of competence in a unit of competency. To be awarded Certificate in Dairy Plant Management Level 4, an individual must demonstrate competence in all the units of competency.

These certificates will be awarded by TVET CDACC in conjunction with the training provider.

# BASIC UNITS OF LEARNING

## COMMUNICATION SKILLS

**UNIT CODE:** DA/CU/PM/BC/01/4/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate communication skills

**Duration of Unit:** 20 Hours

**Unit Description**

This unit describes the competencies required to lead in the dissemination and discussion of ideas, information and issues in the workplace.

**Summary of Learning Outcomes**

1. Obtain and convey workplace information
2. Complete relevant work-related documents
3. Communicate information about workplace processes
4. Lead workplace discussion
5. Identify and communicate issues arising in the workplace

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Obtain and convey workplace information
 | * Communication process
* Modes of communication
* Medium of communication
* Effective communication
* Barriers to communication
* Flow of communication
* Sources of information
* Types of questions
* Organizational policies
* Workplace etiquette
* Ethical work practices in handling communication
 | * Observation
* Interview
* Third party reports
 |
| 1. Complete relevant work-related documents
 | * Types and purposes of workplace documents and forms
* Methods used in filling forms and documents
* Recording workplace data
* Process of distributing workplace forms and documents
* Report writing
* Types of workplace reports
 | * Observation
* Interview
* Third party reports
 |
| 1. Communicate information about workplace processes
 | * Communication process
* Modes of communication
* Medium of communication
* Effective communication
* Barriers to communication
* Flow of communication
* Sources of information
* Organizational policies
* Organization requirements for written and electronic communication methods
* Report writing
* Effective questioning techniques (clarifying and probing)
* Workplace etiquette
* Ethical work practices in handling communication
 | * Observation
* Interview
* Portfolio
 |
| 1. Lead workplace discussion
 | * Methods of discussion e.g.
	+ Coordination meetings
	+ Toolbox discussion
	+ Peer-to-peer discussion
* Solicitation of response
 | * Observation
* Interview
* Third party reports
 |
| 1. Identify and communicate issues arising in the workplace
 | * Identification of problems and issues
* Organizing information on problems and issues
* Relating problems and issues
* Communication barriers affecting workplace discussions
 | * Observation
* Interview
* Portfolio
 |

**Suggested Delivery Methods**

* Discussion
* Role play
* Brainstorming

**Recommended Resources**

* Desktop computers/laptops
* Internet connection
* Projectors
* Telephone
* Report writing templates

**NUMERACY SKILLS**

**UNIT CODE:** DA/CU/PM/BC/02/4/B

**Relationship to Occupational Standards:**

This unit addresses the unit of competency: Demonstrate numeracy skills

**Duration of Unit:** 25hours

**Unit Description**

This unit describes the competencies required by a worker in order to competently Identify and use whole numbers and simple fractions, decimals and percentages; Identify, measure and estimate familiar quantities for work, Read and use familiar maps, plans and diagrams for work, Identify and describe common 2D and some 3D shapes for work, Construct simple tables and graphs for work using familiar data, Identify and interpret information in familiar tables, graphs and charts for work.

**Summary of Learning Outcomes**

1. Identify and use whole numbers and simple fractions, decimals and percentages for work

2. Identify, measure and estimate familiar quantities for work

3. Read and use familiar maps, plans and diagrams for work

4. Identify and describe common 2D and some 3D shapes for work

5. Construct simple tables and graphs for work using familiar data

6. Identify and interpret information in familiar tables, graphs and charts for work

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify and use whole numbers and simple fractions, decimals and percentages for work
 | * Whole numbers
* Simple fractions
* Decimals
* Percentages
* Sizes
* Problem solving methods
* calculations using the 4 operations
* Recording and communicating numerical information
 | * Oral
* Written
* Practical test
* Observation
 |
| 2. Identify, measure and estimate familiar quantities for work | * Measurement information
* Units of measurement
* Estimate familiar and simple amounts
* Selection of appropriate measuring equipment
* Calculate using familiar units of measurement
* Check measurements and results against estimates
* Using informal and some formal mathematical and general language
* Record or report results
 | * Oral
* Written
* Practical test
* Observation
 |
| 3. Read and use familiar maps, plans and diagrams for work | * Maps, plans and diagrams
* Locate items and places in familiar maps, plans and diagrams
* Recognize common symbols and keys in familiar maps, plans and diagrams
* Direction and location of objects, or route or places
* Use of informal and some formal oral mathematical language and symbols
 | * Oral
* Written
* Practical test
* Observation
 |
| 4. Identify and describe common 2D and some 3D shapes for work | * Common 2D shapes and 3D shapes
* Classification of common 2D shapes and designs
* Description of Use informal and some formal language to describe common two-dimensional shapes and some common three-dimensional shapes
* Construction of common 2D shapes
* Match common 3D shapes to their 2D sketches or nets
 | * Oral
* Written
* Practical test
* Observation
 |
| 5. Construct simple tables and graphs for work using familiar data | * Types of graphs
* Determination of data to be collected
* Selection of data collection method
* Collection of data
* Determination of variables from the data collected
* Order and collate data
* Construct a table and enter data
* Construct a graph using data from table
* Check results
* Report or discuss graph information related to work using informal and some formal mathematical and general language
 | * Oral
* Written
* Practical test
* Observation
 |
| 6. Identify and interpret information in familiar tables, graphs and charts for work | * Tables construction and labeling
* i.e. title, headings, rows and columns
* Interpreting information and data in simple tables
* Relaying information of relevant workplace tasks on/in a table
* Identify familiar graphs and charts in familiar texts and contexts
* Locate title, labels, axes, scale and key from familiar graphs and charts
* Identify and interpret information and data in familiar graphs and charts
* Relate information to relevant workplace tasks
 | * Oral
* Written
* Practical test
* Observation
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Practical demonstration of tasks by trainer
* Practice by trainees/ role play
* Discussion
* Observations and comments and corrections by trainers

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Mathematical tables

**DIGITAL LITERACY**

**UNIT CODE:** DA/CU/PM/BC/03/4/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate digital literacy

**Duration of Unit:** 35 hours

**Unit Description**

This unit covers the competencies required to effectively demonstrate digital literacy in a working environment. It entails identifying and using digital devices such as smartphones, tablets, laptops and desktop PCs for purposes of communication and performing work related tasks at the work place.

**Summary of Learning Outcomes**

1. Identify computer hardware and software
2. Apply security measures to data, hardware and software
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software
 | * Meaning of a computer
* Functions of a computer
* Components of a computer
* Classification of computers
 | * Written
* Oral
* Observation
 |
| 1. Apply security measures to data, hardware and software
 | * Data security and control
* Security threats and control measures
* Types of computer crimes
* Detection and protection against computer crimes
 | * Written tests
* Oral presentation
* Observation
* Projects
 |
| 1. Apply computer software in solving tasks
 | * Operating system
* Word processing
* Spread sheets
* Data base
 | * Oral questioning
* Observation
* Project
 |
| 1. Apply internet and email in communication at workplace
 | * Computer networks
* Uses of internet
* Electronic mail (e-mail) concept
 | * Oral questioning
* Observation
* Oral presentation
* Written report
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practical work by trainee
* Viewing of related videos
* Project
* Group discussions

**Recommended Resources**

* Desk top computers
* Laptop computers
* Other digital devices
* Printers
* Storage devices
* Internet access
* Computer software

**ENTREPRENEURIAL SKILLS**

**UNIT CODE:** DA/CU/PM/BC/04/4/B

**Relationship to occupational standards**

This unit addresses the unit of competency: Demonstrate entrepreneurial skills

**Duration of unit:** 60 hours

**Unit description**

This unit describes the competencies critical to demonstration of entrepreneurial skills. It includes creating and maintaining small scale business, establishing small scale business customer base, managing and growing a small business.

**Summary of Learning Outcomes**

1. Create and maintain small scale business
2. Establish small scale business customer base
3. Manage small scale business
4. Grow/ expand small scale business

 **Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Create and maintain small scale business
 | * Starting a small business
* Legal regulatory requirements in starting a small business
* SWOT/ PESTEL analysis
* Conducting market/industry survey
* Generation and evaluation of business ideas
* Matching competencies with business opportunities
* Forms of business ownership
* Location of a small business
* Legal and regulatory requirement
* Resources required to start a small business
* Common terminologies in entrepreneurship
* Entrepreneurship in national development
* Self-employment
* Formal and informal employment
* Entrepreneurial culture
* Myths associated with entrepreneurship
* Types, characteristics, qualities & role of entrepreneurs
* History, development and importance of entrepreneurship
* Theories of entrepreneurship
* Quality assurance for small businesses
* Policies and procedures on occupational safety and health and environmental concerns
 | * Observation
* Case studies
* Individual/group assignments
* projects
* Written
* Oral
 |
| 1. Establish small scale business customer base
 | * Good staff/workers and customer relations
* Marketing strategy
* Identifying and maintain new customers and markets
* Product/ service promotions
* Products / services diversification
* SWOT / PESTEL analysis
* Conducting a business survey
* Generating Business ideas
* Business opportunities
 | * Observation
* Case studies
* Individual/group assignments
* projects
* Written
* Oral
 |
| 1. Manage small scale business
 | * Organization of a small business
* Small business’ business plan
* Marketing for small businesses
* Managing finances for small business
* Production/ operation process for goods/services
* Small business records management
* Book keeping and auditing for small businesses
* Business support services
* Small business resources mobilization and utilization
* Basic business social responsibility
* Management of small business
* Word processing concepts in small business management
* Computer application software
* Monitoring and controlling business operations
 | * Oral
* Observation
* Case studies
* Individual/group assignments
* projects
* Written
 |
| 1. Grow/expand small scale business
 | * Methods of growing small business
* Resources for growing small business
* Small business growth plan
* Computer software in business development
* ICT and business growth
 | * Observation
* Case studies
* Individual/group assignments
* projects
* Written
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Demonstration by trainer
* Practice by trainee
* Role play
* Case study

**Recommended Resources**

* Case studies for small businesses
* Business plan templates
* Lap top/ desk top computer
* Internet
* Telephone
* Writing materials

**EMPLOYABILITY SKILLS**

**UNIT CODE:** DA/CU/PM/BC/05/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate employability skills

**Duration of Unit:** 30 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating critical safe work habits, demonstrating workplace learning and workplace ethics.

**Summary of Learning Outcomes**

1. Conduct self-management
2. Demonstrate critical safe work habits
3. Demonstrate workplace learning
4. Demonstrate workplace ethics

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct self-management
 | * Self-awareness
* Formulating personal vision, mission and goals
* Strategies for overcoming life challenges
* Emotional intelligence
* Assertiveness
* Expressing personal thoughts, feelings and beliefs
* Developing and maintaining high self-esteem
* Developing and maintaining positive self-image
* Articulating ideas and aspirations
* Accountability and responsibility
* Good work habits
* Self-awareness
* Self-development
* Financial literacy
* Healthy lifestyle practices
 | * Observation
* Written
* Oral interview
* Third party report
 |
| 1. Demonstrate critical safe work habits
 | * Stress and stress management
* Punctuality and time consciousness
* Interpersonal communication
* Sharing information
* Leisure
* Integratingpersonal objectives into organizational objectives
* Resources utilization
* Setting work priorities
* HIV and AIDS
* Drug and substance abuse
* Handling emerging issues
 | * Observation
* Written
* Oral interview
* Third party report
 |
| 1. Demonstrate workplace learning
 | * Personal training needs identification and assessment
* Managing own learning
* Contributing to the learning community at the workplace
* Cultural aspects of work
* Variety of learning context
* Application of learning
* Safe use of technology
* Identifying opportunities
* Workplace innovation
* Performance improvement
* Handling emerging issues
* Future trends and concerns in learning
 | * Observation
* Oral interview
* Written
* Third party report
 |
| 1. Demonstrate workplace ethics
 | * Meaning of ethics
* Ethical perspectives
* Principles of ethics
* Values and beliefs
* Ethical standards
* Organization code of ethics
* Common ethical dilemmas
* Organization culture
* Corruption, bribery and conflict of interest
* Privacy and data protection
* Diversity, harassment and mutual respect
* Financial responsibility/Bccountability
* Etiquette
* Personal and professional integrity
* Commitment to jurisdictional laws
* Emerging issues in ethics
 | * Observation
* Oral interview
* Written
* Third party report
 |

**Suggested Methods of Delivery**

* Instructor lead facilitation of theory
* Demonstrations
* Simulation/Role play
* Group Discussion
* Presentations
* Projects
* Case studies
* Assignments

**Recommended Resources**

* Computers
* Stationery
* Charts
* Video clips
* Audio tapes
* Radio sets
* TV sets
* LCD projectors

**ENVIRONMENTAL LITERACY**

**UNIT CODE:** DA/CU/PM/BC/06/4/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate environmental literacy

**Duration of Unit:** 20hours

**Unit Description**

This unit describes the competencies required to control environmental hazard, control environmental pollution, comply with workplace sustainable resource use and evaluate current practices in relation to resource usage.

**Summary of Learning Outcomes**

1. Control environmental hazard
2. Control environmental Pollution
3. Demonstrate sustainable resource use
4. Evaluate current practices in relation to resource usage

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Control environmental hazard
 | * Purposes and content of Environmental Management and Coordination Act 1999
* Purposes and content of Solid Waste Act
* Storage methods for environmentally hazardous materials
* Disposal methods of hazardous wastes
* Types and uses of PPE in line with environmental regulations
* Occupational Safety and Health Standards (OSHS)
 | * Written questions
* Oral questions
* Observation of work procedures
 |
| 1. Control environmental pollution control
 | * Types of pollution
* Environmental pollution control measures
* Types of solid wastes
* Procedures for solid waste management
* Different types of noise pollution
* Methods for minimizing noise pollution
 | * Written questions
* Oral questions
* Observation of work procedures
* Role play
 |
| 1. Demonstrate sustainable resource use
 | * Types of resources
* Techniques in measuring current usage of resources
* Calculating current usage of resources
* Methods for minimizing wastage
* Waste management procedures
* Principles of 3Rs (Reduce, Reuse, Recycle)
* Methods for economizing or reducing resource consumption
 | * Written questions
* Oral questions
* Observation of work procedures
* Role play
 |
| 1. Evaluate current practices in relation to resource usage
 | * Collection of information on environmental and resource efficiency systems and procedures,
* Measurement and recording of current resource usage
* Analysis and recording of current purchasing strategies.
* Analysis of current work processes to access information and data
* Identification of areas for improvement
 | * Written questions
* Oral questions
* Observation of work procedures
* Role play
 |
| 1. Identify Environmental legislations/conventions for environmental concerns
 | * Environmental issues/concerns
* Environmental legislations /conventions and local ordinances
* Industrial standard /environmental practices
* International Environmental Protocols (Montreal, Kyoto)
* Features of an environmental strategy
 | * Written questions
* Oral questions
* Observation of work procedures
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Practical demonstration of tasks by trainer
* Practice by trainees/ role play
* Discussion
* Observations and comments and corrections by trainers

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Solid Waste Act
* Environmental Management and Coordination Act 1999
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)

**OCCUPATIONAL SAFETY AND HEALTH PRACTICES**

**UNIT CODE:** DA/CU/PM/BC/07/4/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate Safety and Health Practices

**Duration of Unit:** 20 hours

**Unit Description**

This unit describes the competencies required to practice safety and health, and comply with OSH requirements relevant to work.

**Summary of Learning Outcomes**

1. Observe workplace procedures for hazards and risk prevention
2. Participate in arrangements for workplace safety and health maintenance

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment****Methods** |
| 1. Observe workplace procedures for hazards and risk prevention
 | * Arrangement of work area and items in accordance with Company housekeeping procedures
* Adherence to work standards and procedures
* Application of preventive and control measures, including use of safety gears/PPE
* Study and apply standards and procedures for incidents and emergencies.
 | * Oral questions
* Written questions
* Observation of work procedures
 |
| 1. Participate in arrangements for workplace safety and health maintenance
 | * Participating in orientations on OSH requirements/regulations of tasks
* Providing feedback on health, safety, and security concerns to appropriate personnel as required in a sufficiently detailed manner
* Practice workplace procedures for reporting hazards, incidents, injuries and sickness
* OSH requirements/ regulations and workplace safety and hazard control procedures are reviewed, and compliance reported to appropriate personnel
* Identification of needed OSH-related trainings are proposed to appropriate personnel
 | * Oral questions
* Written tests
* Practical test
* Observation of practical work by trainees
 |

**Suggested Delivery Methods**

* Instructor led facilitation of theory
* Practical demonstration of tasks by trainer
* Practice by trainees/ role play
* Discussion
* Observations and comments and corrections by trainers

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE) e.g.
* Mask
* Face mask/shield
* Safety bootsn
* Safety harness
* Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest

# CORE UNITS OF LEARNING

##  RAW MILK CHILLING

**UNIT CODE:** DA/CU/PM/CR/01/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Chill raw milk

**Duration of Unit:** 48 hours

**Unit Description**

This unit specifies the competencies required to operate milk chilling equipment. It involves applying food safety measures to chill raw milk, participating in bulking and cooling milk; cleaning milk chilling equipment and keeping records.

**Summary of Learning Outcomes**

1. Applying food safety measures to chill raw milk
2. Prepare to bulk and chill raw milk
3. Bulk and chill raw milk
4. Complete raw milk chilling

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to chill raw milk
 | * Introduction to food safety
	+ Meaning of food safety
	+ Importance of food safety
	+ Principles of food safety
* Prerequisite programmes
	+ Meaning and importance of prerequisite programmes
	+ Relevant programmes
		- Good laboratory practices
		- Good manufacturing practices
		- Standard Sanitary Operating Procedures
* Hazard analysis
	+ Significance of hazards
	+ Types and sources of hazards
	+ Methods of hazard control
* Components of HACCP plan
	+ Critical control points
	+ Critical control limits
	+ Monitoring procedures on the control limits
	+ Corrective actions
	+ Verification and validation
	+ Record keeping
* Standards and legislations in food safety on chilling raw milk
	+ Code of hygienic practices for milk and milk products
	+ Public health regulations
	+ Standards Act (Cap 496)
	+ Dairy Industry Act (Cap 336)
	+ Food, Drugs and Chemical Substances Act (Cap 254)
	+ Environmental Management and Coordination Act (EMCA)
 | * Written tests
* Oral questioning
* Observation
* Case study
 |
| 1. Prepare to bulk and chill raw milk
 | * + Causes of milk spoilage
	+ Quantity measurement
 | * Written tests
* Observation
* Oral questions
* Third party report
 |
| 1. Bulk and chill raw milk
 | * Types of milk chilling methods
* Good manufacturing practices (GMP)
* Cooling operation
 | * Observation
* Written tests
* Oral questions
* Third party report
 |
| 1. Complete raw milk chilling
 | * + Cleaning and maintenance
	+ Record keeping and documentation.
 | * Observation
* Written tests
* Oral questions
* Third party report
 |

**Suggested Methods of Delivery**

* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction

**Recommended Resources**

|  |
| --- |
| Functional raw milk chilling should have the following: |
| * Weighing balance
* Weighing scale
* Computer software
* Coolers
* Test Equipment and apparatus
* Sampling equipment
* Stationery
* Dispensers
 | * Flow meter
* Measuring cylinder
* Incinerator
* Calculator
* Cleaning tools
* Cleaning agents and sanitizers
* Potable water
* Computer
 | * Protective clothing
* Operation tools
* Printers
* Internet
* Testing reagents
 |

##  FLUID MILK PRODUCTS PROCESSING

**UNIT CODE:** DA/CU/PM/CR/02/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process Fluid Milk Products

**Duration of Unit:** 48 hours

**Unit Description**

This unit specifies the competencies required to operate fluid milk processing equipment. It involves applying food safety measures to process fluid milk products, participating in fluid milk processing, packaging, cleaning of processing equipment, waste management and keeping records.

**Summary of Learning Outcomes**

* 1. Apply food safety measures to process fluid milk products
	2. Prepare to process fluid milk products
	3. Process fluid milk products
	4. Complete fluid milk products processing

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to process fluid milk products
 | * Introduction to food safety
	+ Meaning of food safety
	+ Importance of food safety
	+ Principles of food safety
* Prerequisite programmes
	+ Meaning and importance of prerequisite programmes
	+ Relevant programmes
		- Good laboratory practices
		- Good manufacturing practices
		- Standard Sanitary Operating Procedures
* Hazard analysis
	+ Significance of hazards
	+ Types and sources of hazards
	+ Methods of hazard control
* Components of HACCP plan
	+ Critical control points
	+ Critical control limits
	+ Monitoring procedures on the control limits
	+ Corrective actions
	+ Verification and validation
	+ Record keeping
* Standards and legislations in food safety on processing fluid milk products
	+ Code of hygienic practices for milk and milk products
	+ Public health regulations
	+ Standards Act (Cap 496)
	+ Dairy Industry Act (Cap 336)
	+ Food, Drugs and Chemical Substances Act (Cap 254)
	+ Environmental Management and Coordination Act (EMCA)
 | * Written tests
* Oral questioning
* Observation
* Case study
 |
| 1. Prepare to process fluid milk products
 | * Types of Fluid milk products
	+ Pasteurised
	+ Extended shelf life
	+ Ultra-heat treated (UHT)
* Fluid milk products processing equipment and tools
* Volume measurement.
* Good Manufacturing Practices
 | * Written tests
* Observation
* Oral questions
* Third party report
 |
| 1. Process fluid milk products
 | * + Causes of milk spoilage
	+ Milk separation and standardization
	+ Milk homogenization
	+ Milk heat treatment
	+ Milk packaging and storage
 | * Observation
* Written tests
* Oral questions
* Third party report
 |
| 1. Complete fluid milk products processing
 | * + Milk distribution
	+ Cleaning and maintenance
	+ Dairy waste management
	+ Record keeping and documentation.
 | * Observation
* Written tests
* Oral questions
* Third party report
 |

**Suggested Methods of Delivery**

* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction

**Recommended Resources**

|  |
| --- |
| Functional fluid milk production should have the following: |
| * Weighing balance
* Weighing scale
* Computer software
* Heat exchangers and Coolers
* Packaging equipment and materials
* Test Equipment and apparatus
* Sampling equipment
* Stationery
* Dispensers
 | * Measuring cylinder
* Incinerator
* Calculator
* Cleaning tools
* Cleaning agents and sanitizers
* Potable water
* Computer
* Protective clothing
* Operation tools
* Printers
* Internet
 | * Testing reagents
* KEBS standards
* Milk processing manual
 |

##  FERMENTED MILK PRODUCTS PROCESSING

**UNIT CODE:** DA/CU/PM/CR/03/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process Fermented Milk Products

**Duration of Unit:** 96 hours

**Unit Description**

This unit specifies the competencies required to process fermented milk products. It involves applying food safety measures to process fermented milk products, participating in making fermented milk products; packaging; cleaning of processing equipment, waste management and record keeping.

**Summary of Learning Outcomes**

1. Apply food safety measures to process fermented milk products
2. Prepare to process fermented milk products
3. Process fermented milk products
4. Complete fermented milk products processing

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to process fermented milk products
 | * Introduction to food safety
	+ Meaning of food safety
	+ Importance of food safety
	+ Principles of food safety
* Prerequisite programmes
	+ Meaning and importance of prerequisite programmes
	+ Relevant programmes
		- Good laboratory practices
		- Good manufacturing practices
		- Standard Sanitary Operating Procedures
* Hazard analysis
	+ Significance of hazards
	+ Types and sources of hazards
	+ Methods of hazard control
* Components of HACCP plan
	+ Critical control points
	+ Critical control limits
	+ Monitoring procedures on the control limits
	+ Corrective actions
	+ Verification and validation
	+ Record keeping
* Standards and legislations in food safety on processing fermented milk products
	+ Code of hygienic practices for milk and milk products
	+ Public health regulations
	+ Standards Act (Cap 496)
	+ Dairy Industry Act (Cap 336)
	+ Food, Drugs and Chemical Substances Act (Cap 254)
	+ Environmental Management and Coordination Act (EMCA)
 | * Written tests
* Oral questioning
* Observation
* Case study
 |
| 1. Prepare to process fermented milk products
 | * Types of Fermented milk products
	+ Yoghurt
	+ Cultured buttermilk
* Fermented milk products processing equipment and tools
* Volume measurement.
* Good Manufacturing Practices
 | * Written tests
* Observation
* Oral questions
* Third party report
 |
| 1. Process fermented milk products
 | * + Milk separation and standardization
	+ Milk homogenization
	+ Milk heat treatment
	+ Types of food ingredients and additives
	+ Causes of milk spoilage.
	+ Types of dairy starter cultures
	+ Steps of yoghurt production
	+ Steps of cultured buttermilk production
	+ Steps of probiotic milk production.
	+ Milk packaging and storage
 | * Observation
* Written tests
* Oral questions
* Third party report
 |
| 1. Complete fermented milk products processing
 | * + Milk distribution
	+ Cleaning and maintenance
	+ Dairy waste and management
	+ Record keeping and documentation.
 | * Observation
* Written tests
* Oral questions
* Third party report
 |

**Suggested Methods of Delivery**

* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction

**Recommended Resources**

|  |
| --- |
| Functional fermented milk production should have the following: |
| * Weighing balance
* Computer software
* Heat exchangers and Coolers
* Packaging equipment and materials
* Test Equipment and apparatus
* Sampling equipment
* Stationery
* KEBS standards
 | * Measuring cylinder
* Incinerator
* Calculator
* Cleaning tools
* Cleaning agents and sanitizers
* Potable water
* Computer
* Protective clothing
* Operation tools
* Printers
* Internet
 | * Testing reagents
* Sweeteners
* Stabilizer
* Emulsifiers
* Food colours and flavours
* Fruits and juices
* Thickeners
* Land fill
* Milk processing manual
 |

##  FAT BASED MILK PRODUCTS PROCESSING

**UNIT CODE:** DA/CU/PM/CR/04/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process fat-based milk products

**Duration of Unit:** 48 hours

**Unit Description**

This unit specifies the competencies required to process fat based milk products. It involves applying food safety measures to process fat-based milk products, participating in assembling raw materials and equipment; processing, packaging and storage; record keeping,

**Summary of Learning Outcomes**

1. Applying food safety measures to process fat based milk products
2. Prepare to process fat based milk products
3. Process fat-based milk products
4. Complete processing of fat-based milk products

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to process fat-based milk products
 | * Introduction to food safety
	+ Meaning of food safety
	+ Importance of food safety
	+ Principles of food safety
* Prerequisite programmes
	+ Meaning and importance of prerequisite programmes
	+ Relevant programmes
		- Good laboratory practices
		- Good manufacturing practices
		- Standard Sanitary Operating Procedures
* Hazard analysis
	+ Significance of hazards
	+ Types and sources of hazards
	+ Methods of hazard control
* Components of HACCP plan
	+ Critical control points
	+ Critical control limits
	+ Monitoring procedures on the control limits
	+ Corrective actions
	+ Verification and validation
	+ Record keeping
* Standards and legislations in food safety on to process fat-based milk products
	+ Code of hygienic practices for milk and milk products
	+ Public health regulations
	+ Standards Act (Cap 496)
	+ Dairy Industry Act (Cap 336)
	+ Food, Drugs and Chemical Substances Act (Cap 254)
	+ Environmental Management and Coordination Act (EMCA)
 | * Written tests
* Oral questioning
* Observation
* Case study
 |
| 1. Prepare to process fat based milk products
 | * Types of Fatbased milk products
	+ Cream
	+ Butter
	+ Anhydrous milk fat
	+ Ice cream
* Fatbased milk products production equipment and tools
* Good Manufacturing Practices
 | * Written tests
* Observation
* Oral questions
* Third party report
 |
| 1. Process fat-based milk products
 | * Milk separation
* Milk heat treatment
* Food ingredients and additives
* steps in butter production
* steps in anhydrous milk fat production.
* Steps in ice cream production
* Fatbased milk products packaging and storage
 | * Observation
* Written tests
* Oral questions
* Third party report
 |
| 1. Complete processing of fat-based milk products
 | * + Milk distribution
	+ Cleaning and maintenance
	+ Dairy waste and management
	+ Record keeping and documentation.
 | * Observation
* Written tests
* Oral questions
* Third party report
 |

**Suggested Methods of Delivery**

* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction

**Recommended Resources**

|  |
| --- |
| Functional Production of Fatbased Milk Products should have the following: |
| * Weighing balance
* Weighing scale
* Heat exchangers and Coolers
* Packaging equipment and materials
* Test Equipment and apparatus
* Sampling equipment
* Stationery
* Ice cream freezers
* Cream separator
* Land fill
 | * Incinerator
* Calculator
* Cleaning tools
* Cleaning agents and sanitizers
* Potable water
* Computer
* Protective clothing
* Operation tools
* Internet
* Milk homogenizer
* Food flavours and colours
 | * Testing reagents
* Sweeteners
* Thickeners
* Stabilizers
* Emulsifiers
* Milk powder
* Cream
* Skim milk
* Whole milk
* Butter churn
* KEBS standards
* Milk processing manual
 |

##  CHEESE PRODUCTION

**UNIT CODE:** DA/CU/PM/CR/05/4/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce ripened and unripened cheese

**Duration of Unit:** 96 hours

**Unit Description**

This unit specifies the competencies required to produce ripened and un-ripened cheese. It involves applying food safety measures to produce cheese, participating in cheese making; packaging, and storage; record keeping; equipment cleaning and waste management.

**Summary of Learning Outcomes**

1. Apply food safety measures to produce cheese
2. Prepare to produce cheese
3. Produce cheese
4. Complete cheese making process

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to produce cheese
 | * Introduction to food safety
	+ Meaning of food safety
	+ Importance of food safety
	+ Principles of food safety
* Prerequisite programmes
	+ Meaning and importance of prerequisite programmes
	+ Relevant programmes
		- Good laboratory practices
		- Good manufacturing practices
		- Standard Sanitary Operating Procedures
* Hazard analysis
	+ Significance of hazards
	+ Types and sources of hazards
	+ Methods of hazard control
* Components of HACCP plan
	+ Critical control points
	+ Critical control limits
	+ Monitoring procedures on the control limits
	+ Corrective actions
	+ Verification and validation
	+ Record keeping
* Standards and legislations in food safety on producing cheese
	+ Code of hygienic practices for milk and milk products
	+ Public health regulations
	+ Standards Act (Cap 496)
	+ Dairy Industry Act (Cap 336)
	+ Food, Drugs and Chemical Substances Act (Cap 254)
	+ Environmental Management and Coordination Act (EMCA)
 | * Written tests
* Oral questioning
* Observation
* Case study
 |
| 1. Prepare to produce cheese
 | * Cheese recipe
* Good Manufacturing Practices
 | * Written tests
* Observation
* Oral questions
* Third party report
 |
| 1. Produce cheese
 | * Milk separation and standardization
* Milk pre-heat treatment
* Cheese ingredients and additives
* Types of dairy Starter cultures
* Types of milk coagulants
	+ Cheddar
	+ Gouda
	+ Cottage
	+ Queso blanco
	+ Mozzarella
	+ Feta
	+ Cream cheese
* Cheese packaging and storage
 | * Observation
* Product analysis
* Written tests
* Oral questions
* Third party report
 |
| 1. Complete cheese making process
 | * + Cheese distribution
	+ Cleaning and maintenance
	+ Dairy waste and management
	+ Record keeping and documentation.
 | * Observation
* Written tests
* Oral questions
* Third party report
 |

**Suggested Methods of Delivery**

* Demonstration by trainer
* Practice by the trainee
* Field trips
* Discussions
* Direct instruction

**Recommended Resources**

|  |
| --- |
| Functional production of ripened and unripened cheese should have the following: |
| * Weighing balance
* Heat exchangers
* Cold room
* Cheese vats
* Cheese knives
* Stirrer and strainers
* Cheese cloth
* Cheese moulds
* Cheese press
* Cheese coating
* Packaging equipment and materials
* Internet
 | * Measuring cylinder
* Incinerator
* Calculator
* Cleaning tools
* Cleaning agents and sanitizers
* Potable water
* Computer
* Protective clothing
* Operation tools
* Printers
* Sampling equipment
* Stationery
 | * Testing reagents
* Food colours
* Salts
* Land fill
* KEBS standards
* Milk processing manual
* Test Equipment and apparatus
* Test Equipment and apparatus
 |