****

**REPUBLIC OF KENYA**

**COMPETENCY BASED CURRICULUM**

**FOR**

**DAIRY PLANT MANAGEMENT**

**LEVEL 6**



TVET CDACC

P.O. BOX 15745-00100

NAIROBI

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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 (Sessional Paper No. 4 of 2016). 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 and the Sessional Paper No. 4 of 2016 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, Food Safety 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

HCD Horticultural Crops Directorate

HCP Horticultural Crop Production

DA Dairy Sector

ICT Information Communication Technology

IPM Integrated Pest Management

KCSE Kenya Certificate of Secondary Education

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/01/6/B**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version control

# **COURSE OVERVIEW**

This course is designed to equip individuals with competencies for management of a dairy plant. It entails procuring raw milk, chilling raw milk, processing fluid milk, fermented milk products, cheese, fat-based milk products, concentrated milk products, controlling quality of dairy products and managing a dairy enterprise.

The course consists of the following basic and core units of learning

**Basic Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credits** |
| DA/CU/PM/BC/01/6/B | Communication skills | 40 | 4 |
| DA/CU/PM/BC/02/6/B | Numeracy skills | 60 | 6 |
| DA/CU/PM/BC/03/6/B | Digital literacy | 60 | 6 |
| DA/CU/PM/BC/04/6/B | Entrepreneurial skills | 100 | 10 |
| DA/CU/PM/BC/05/6/B | Employability skills | 80 | 8 |
| DA/CU/PM/BC/06/6/B | Environmental literacy | 40 | 4 |
| DA/CU/PM/BC/07/6/B | Occupational safety and health practices | 40 | 4 |
| **Total** | | **420** | **42** |

**Core Units of Learning**

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit Code** | **Unit Title** | **Duration in Hours** | **Credits** |
| DA/CU/PM/CR/01/6/B | Raw milk procurement | 80 | 8 |
| DA/CU/PM/CR/02/6/B | Raw milk Chilling | 150 | 15 |
| DA/CU/PM/CR/03/6/B | Fluid milk products processing | 150 | 15 |
| DA/CU/PM/CR/04/6/B | Fermented milk products processing | 200 | 20 |
| DA/CU/PM/CR/05/6/B | Concentrated milk products processing | 150 | 15 |
| DA/CU/PM/CR/06/6/B | Fat based milk products processing | 200 | 20 |
| DA/CU/PM/CR/07/6/B | Cheese production | 200 | 20 |
| DA/CU/PM/CR/08/6/B | Dairy products quality control | 300 | 30 |
| DA/CU/PM/CR/09/6/B | Dairy business management | 100 | 10 |
| **Attachment** | | **480** | **48** |
| **Grand Total** | | **2430** | **243** |

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The total duration of the course for an average trainee is 2430 hours which is equivalent to 81 weeks at 30 hours of learning per week, plus 16 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 C- (minus).

**Or**

1. Dairy Plant Management Craft Certificate Level 5.

**Or**

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

**Industrial attachment**

An individual enrolled in this course will undergo 16 weeks industrial attachment at a dairy farm. 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 6, 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/01/6/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate communication skills

**Duration of Unit:** 40 hours

**Unit Description**

This unit covers the competencies required in meeting communication needs of clients and colleagues and developing, establishing, maintaining communication pathways and strategies. It also covers competencies for conducting interview, facilitating group discussion and representing the organization in various forums.

**Summary of Learning Outcomes**

1. Meet communication needs of clients and colleagues
2. Develop communication strategies
3. Establish and maintain communication pathways
4. Promote use of communication strategies
5. Conduct interview
6. Facilitate group discussion
7. Represent the organization

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Meet communication needs of clients and colleagues | * 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 * Active listening * Feedback * Interpretation * Flexibility in communication * Types of communication strategies * Elements of communication strategy | * Interview * Written |
| 1. Develop communication strategies | * Dynamics of groups * Styles of group leadership * Openness and flexibility in communication * Communication skills relevant to client groups | * Interview * Written |
| 1. Establish and maintain communication pathways | * Types of communication pathways | * Interview * Written |
| 1. Promote use of communication strategies | * Application of elements of communication strategies * Effective communication techniques | * Interview * Written |
| 1. Conduct interview | * Types of interview * Establishing rapport * Facilitating resolution of issues * Developing action plans | * Interview * Written |
| 1. Facilitate group discussion | * Identification of communication needs * Dynamics of groups * Styles of group leadership * Presentation of information * Encouraging group members participation * Evaluating group communication strategies | * Interview * Written |
| 1. Represent the organization | * Presentation techniques * Development of a presentation * Multi-media utilization in presentation * Communication skills relevant to client groups | * Interview * Written |

**Suggested Delivery Methods**

* Discussion
* Role playing
* Simulation
* Direct instruction
* Practice by trainee

**Recommended Resources**

* Desktop computers/laptops
* Internet connection
* Projectors
* Telephone

# NUMERACY SKILLS

**UNIT CODE:** DA/CU/PM/BC/02/6/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate numeracy skills

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes the competencies required by a worker in order to apply a wide range of mathematical calculations for work; apply ratios, rates and proportions to solve problems; estimate, measure and calculate measurement for work; Use detailed maps to plan travel routes for work; Use geometry to draw and construct 2D and 3D shapes for work; Collect, organize and interpret statistical data; Use routine formula and algebraic expressions for work and use common functions of a scientific calculator

**Summary of Learning Outcomes**

1. Apply a wide range of mathematical calculations for work
2. Apply ratios, rates and proportions to solve problems
3. Estimate, measure and calculate measurement for work
4. Use detailed maps to plan travel routes for work
5. Use geometry to draw and construct 2D and 3D shapes for work
6. Collect, organize and interpret statistical data
7. Use routine formula and algebraic expressions for work
8. Use common functions of a scientific calculator

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply a wide range of mathematical calculations for work | * Fundamentals of mathematics * Addition, subtraction, multiplication and division of positive and negative numbers * Algebraic expressions manipulation * Forms of fractions, decimals and percentages * Expression of numbers as powers and roots | * Written tests * Assignments * Supervised exercises |
| 1. Apply ratios, rates and proportions to solve problems | * Rates, ratios and proportions * Meaning * Conversions into percentages * Direct and inverse proportions determination * Performing calculations * Construction of graphs, charts and tables * Recording of information | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Estimate, measure and calculate measurement for work | * Units of measurements and their symbols * Identification and selection of measuring equipment * Conversion of units of measurement * Perimeters of regular figures * Areas of regular figures * Volumes of regular figures * Carrying out measurements * Recording of information | * Assignments * Supervised exercises * Written tests |
| 1. Use detailed maps to plan travel routes for work | * Identification of features in routine maps and plans * Symbols and keys used in routine maps and plans * Identification and interpretation of orientation of map to North * Demonstrate understanding of direction and location * Apply simple scale to estimate length of objects, or distance to location or object * Give and receive directions using both formal and informal language * Planning of routes * Calculation of distance, speed and time | * Oral * Written * Practical test * Observation |
| 1. Use geometry to draw and construct 2D and 3D shapes for work | * Identify two dimensional shapes and routine three-dimensional shapes in everyday objects and in different orientations * Explain the use and application of shapes * Use formal and informal mathematical language and symbols to describe and compare the features of two-dimensional shapes and routine three-dimensional shapes * Identify common angles * Estimate common angles in everyday objects * Evaluation of unknown angles * Use formal and informal mathematical language to describe and compare common angles * Symmetry and similarity * Use common geometric instruments to draw two dimensional shapes * Construct routine three dimensional objects from given nets |  |
| 1. Collect, organize and interpret statistical data | * + Classification of data * Grouped data * Ungrouped data   + Data collection * Observation * Recording   + Distinguishing between sampling and census   + Importance of sampling   + Errors in sampling   + Types of sampling and their limitations e.g. * Stratified random * Cluster * Judgmental   + Tabulation of data * Class intervals * Class boundaries * Frequency tables * Cumulative frequency   + Diagrammatic and graphical presentation of data e.g. * Histograms * Frequency polygons * Bar charts * Pie charts * Cumulative frequency curves * Interpretation of data | * Assignments * Supervised exercises * Written tests |
| 1. Use routine formula and algebraic expressions for work | * + Solving linear equations   + Linear graphs * Plotting * Interpretation   + Applications of linear graphs * Curves of first and second degree * Plotting * Interpretation | * Assignments * Supervised exercises * Written tests |
| 8. Use common functions of a scientific calculator | * Identify and use keys for common functions on a calculator * Calculate using whole numbers, money and routine decimals and percentages * Calculate with routine fractions and percentages * Apply order of operations to solve multi-step calculations * Interpret display and record result | * Oral * Written * Practical test * Observation |

**Suggested Delivery Methods**

* Group discussions
* Demonstration by trainer
* Practical work by trainee
* Exercises

**Recommended Resources**

* Calculators
* Rulers, pencils, erasers
* Charts with presentations of data
* Graph books
* Dice

# DIGITAL LITERACY

**UNIT CODE:** DA/CU/PM/BC/03/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate digital literacy

**Duration of Unit:** 60 hours

**Unit Description**

This unit describes competencies required to use a computer and other digital devices for the purposes of communication, work performance and management at the workplace.

**Summary of Learning Outcomes**

1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software | * Concepts of ICT * Functions of ICT * History of computers * Components of a computer * Classification of computers | * Written tests * Oral presentation * 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 * Laws governing protection of ICT | * Written tests * Oral presentation * Observation * Project |
| 1. Apply computer software in solving tasks | * Operating system * Word processing * Spread sheets * Data base design and manipulation * Data manipulation, storage and retrieval | * Oral questioning * Observation * Project |
| 1. Apply internet and email in communication at workplace | * Computer networks * Network configurations * Uses of internet * Electronic mail (e-mail) concept | * Oral questioning * Observation * Oral presentation * Written report |
| 1. Apply desktop publishing in official assignments | * Concept of desktop publishing * Opening publication window * Identifying different tools and tool bars * Determining page layout * Opening, saving and closing files * Drawing various shapes using DTP * Using colour pellets to enhance a document * Inserting text frames * Importing and exporting text * Object linking and embedding * Designing of various publications * Printing of various publications | * Oral questioning * Observation * Oral presentation * Written report * Project |
| 1. Prepare presentation packages | * Types of presentation packages * Procedure of creating slides * Formatting slides * Presentation of slides * Procedure for editing objects | * Oral questioning * Observation * Oral presentation * Written report * Project |

**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

# ENTREPRENEURSHIP EDUCATION

**UNIT CODE:** DA/CU/PM/BC/04/6/B

**Relationship to occupational standards**

This unit addresses the unit of competency: Demonstrate understanding of entrepreneurship

**Duration of unit:** 100 hours

**Unit Description**

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

**Summary of Learning Outcomes**

* 1. Demonstrate understanding of who an entrepreneur
  2. Demonstrate knowledge of entrepreneurship and self-employment
  3. Identify entrepreneurship opportunities
  4. Create entrepreneurial awareness
  5. Apply entrepreneurial motivation
  6. Develop business innovative strategies
  7. Develop Business plan

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Demonstrate knowledge of entrepreneurship and self-employment | * Importance of self-employment * Requirements for entry into self-employment * Role of an Entrepreneur in business * Contributions of Entrepreneurs to National development * Entrepreneurship culture in Kenya * Born or made entrepreneurs | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Identify entrepreneurship opportunities | * Business ideas and opportunities * Sources of business ideas * Business life cycle * Legal aspects of business * Assessment of product demand * Business environment * Factors to consider when evaluating business environment * Technology in business | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Create entrepreneurial awareness | * Forms of businesses * Sources of business finance * Factors in selecting source of business finance * Governing policies on Small Scale Enterprises (SSEs) * Problems of starting and operating SSEs | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Apply entrepreneurial motivation | * Internal and external motivation * Motivational theories * Self-assessment * Entrepreneurial orientation * Effective communications in entrepreneurship * Principles of communication * Entrepreneurial motivation | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Develop business innovative strategies | * Innovation in business * Small business Strategic Plan * Creativity in business development * Linkages with other entrepreneurs * ICT in business growth and development | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Develop Business Plan | * Business description * Marketing plan * Organizational/Management * plan * Production/operation plan * Financial plan * Executive summary * Presentation of Business Plan | * Observation * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |

**Suggested Methods of instruction:**

* Direct instruction
* Project
* Case studies
* Field trips
* Discussions
* Demonstration
* Question and answer
* Problem solving
* Experiential
* Internship
* Team training
* Guest speakers

**Recommended Resources**

* Case studies
* Business plan templates
* Computers
* Overhead projectors
* Internet
* Mobile phone
* Video clips
* Films
* Newspapers and Handouts
* Business Journals
* Writing materials

# EMPLOYABILITY SKILLS

**UNIT CODE:** DA/CU/PM/BC/05/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate employability skills

**Duration of Unit:** 80 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing ethical performance.

**Summary of Learning Outcomes**

1. Conduct self-management
2. Demonstrate interpersonal communication
3. Demonstrate critical safe work habits
4. Lead a workplace team
5. Plan and organize work
6. Maintain professional growth and development
7. Demonstrate workplace learning
8. Demonstrate problem solving skills
9. Manage ethical performance

**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 * Managing emotions * Emotional intelligence * Assertiveness versus aggressiveness * Expressing personal thoughts, feelings and beliefs * Developing and maintaining high self-esteem * Developing and maintaining positive self-image * Setting performance targets * Monitoring and evaluating performance * Articulating ideas and aspirations * Accountability and responsibility * Good work habits * Self-awareness * Values and beliefs * Self-development * Financial literacy * Healthy lifestyle practices * Adopting safety practices | * Observation * Written * Oral interview * Third party report |
| 1. Demonstrate interpersonal communication | * Meaning of interpersonal communication * Listening skills * Types of audience * Public speaking * Writing skills * Negotiation skills * Reading skills * Meaning of empathy * Understanding customers’ needs * Establishing communication networks * Assertiveness * Sharing information | * Observation * Written * Oral interview * Third party report |
| 1. Demonstrate critical safe work habits | * Stress and stress management * Time concept * Punctuality and time consciousness * Leisure * Integratingpersonal objectives into organizational objectives * Resources mobilization * Resources utilization * Setting work priorities * Developing healthy relationships * HIV and AIDS * Drug and substance abuse * Managing emerging issues | * Observation * Written * Oral interview * Third party report |
| 1. Lead a workplace team | * Leadership qualities * Power and authority * Team building * Determination of team roles and objectives * Team parameters and relationships * Individual responsibilities in a team * Forms of communication * Complementing team activities * Gender and gender mainstreaming * Human rights * Developing healthy relationships * Maintaining relationships * Conflicts and conflict resolution * Coaching and mentoring skills | * Observation * Oral interview * Written * Third party report |
| 1. Plan and organize work | * Functions of management * Planning * Organizing * Time management * Decision making concept * Task allocation * Developing work plans * Developing work goals/objectives and deliverables * Monitoring work activities * Evaluating work activities * Resource mobilization * Resource allocation * Resource utilization * Proactive planning * Risk evaluation * Problem solving * Collecting, analysing and organising information * Negotiation | * Observation * Oral interview * Written * Third party report |
| 1. Maintain professional growth and development | * Avenues for professional growth * Training and career opportunities * Assessing training needs * Mobilizing training resources * Licenses and certifications for professional growth and development * Pursuing personal and organizational goals * Managing work priorities and commitments * Recognizing career advancement | * Observation * Oral interview * Written * Third party report |
| 1. Demonstrate workplace learning | * Managing own learning * Mentoring * Coaching * Contributing to the learning community at the workplace * Cultural aspects of work * Networking * Variety of learning context * Application of learning * Safe use of technology * Taking initiative/proactivity * Flexibility * Identifying opportunities * Generating new ideas * Workplace innovation * Performance improvement * Managing emerging issues * Future trends and concerns in learning | * Observation * Oral interview * Written * Third party report |
| 1. Demonstrate problem solving skills | * Critical thinking process * Data analysis tools * Decision making * Creative thinking * Development of creative, innovative and practical solutions * Independence in identifying and solving problems * Solving problems in teams * Application of problem-solving strategies * Testing assumptions * Resolving customer concerns | * Observation * Oral interview * Written * Third party report |
| 1. Manage ethical performance | * Meaning of ethics * Ethical perspectives * Principles of ethics * 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/06/6/B

**Relationship to Occupational Standards**:

This unit addresses the unit standard: **Demonstrate environmental literacy**

**Duration of Unit:** 40 hours

**Unit Description**

This unit describes the competencies required to control environmental hazard, control environmental pollution, comply with workplace sustainable resource use, evaluate current practices in relation to resource usage, identify environmental legislations/conventions for environmental concerns, implement specific environmental programs, monitor activities on environmental protection/programs, analyse resource use and develop resource conservation plans.

**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
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs
8. Analyse resource use
9. Develop resource conservation plans

**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 * 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 |
| 1. Implement specific environmental programs | * Community needs and expectations * Resource availability * 5s of good housekeeping * Identification of programs/Bctivities * Setting of individual roles /responsibilities * Resolving problems /constraints encountered * Consultation with stakeholders | * Written questions * Oral questions * Observation of work procedures * Role play |
| 1. Monitor activities on Environmental protection/Programs | * Periodic monitoring and Evaluation of activities * Gathering feedback from stakeholders * Analysing data gathered * Documentation of recommendations and submission * Setting of management support systems to sustain and enhance the program * Monitoring and reporting of environmental incidents to concerned /proper authorities | * Oral questions * Written tests * Practical test * Observation |
| 1. Analyse resource use | * Identification of resource consuming processes * Determination of quantity and nature of resource consumed * Analysis of resource flow through different parts of the process. * Classification of wastes for possible source of resources. | * Written tests * Oral questions * Practical test * Observation |
| 1. Develop resource Conservation plans | * Determination of efficiency of use/conversion of resources * Causes of low efficiency of use of resources * Plans for increasing the efficiency of resource use | * Written tests * Oral questions * Practical test * Observation |

**Suggested Delivery Methods**

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

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Environmental Management and Coordination Act 1999
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)
* ISO standards
* Company environmental management systems (EMS)
* Montreal Protocol
* Kyoto Protocol

# OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** DA/CU/PM/BC/07/6/B

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate occupational safety and health practices

**Duration of Unit:** 40 hours

**Unit Description**

This unit describes the competencies required to comply with regulatory and organizational requirements for occupational safety and health.

**Summary of Learning Outcomes**

1. Identify workplace hazards and risk
2. Identify and implement appropriate control measures to hazards and risks
3. Implement OSH programs, procedures and policies/guidelines

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify workplace hazards and risks | * Identification of hazards in the workplace and/or the indicators of their presence * Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace * Gathering of OSH issues and/or concerns | * Oral questions * Written tests * Observation of trainees identify hazards and risks |
| 1. Identify and implement appropriate control measure to hazards and risks | * Prevention and control measures e.g. use of PPE * Contingency measures | * Oral questions * Written tests * Practical tests * Observation of implementation of control measures |
| 1. Implement OSH   programs, procedures  and policies/guidelines | * Company OSH program, procedures and policies/guidelines * Implementation of OSH procedures and policies/ guidelines * Training of team members and advice on OSH standards and procedures * Implementation of procedures for maintaining OSH-related records | * Oral questions * Written tests * Practical test * Observation |

**Suggested Delivery Methods**

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

**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 boots
* 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 PROCUREMENT

**UNIT CODE:** DA/CU/PM/CR/01/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Procure raw milk

**Duration of Unit:** 64 hours

**Unit Description**

This unit specifies the competencies required to procure raw milk. It involves applying food safety measures in raw milk sourcing, quality and quantity assessment, transportation and record keeping.

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to procure raw milk
2. Prepare to procure raw milk
3. Procure raw milk
4. Evaluate raw milk procurement
5. Complete raw milk procurement

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to procure raw milk | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Practical report * Third party report |
| 1. Prepare to procure raw milk | * + Geography of milk producing areas   + Factors affecting milk production   + Pricing of milk   + Tools, equipment and materials for milk procurement | * Written tests * Observation * Oral questions * Third party report |
| 1. Procure raw milk | * + Milk collection systems   + Milk transportation   + Good manufacturing practices (GMP)   + Methods of quantity measurements | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate raw milk procurement | * + Sampling procedures * Random * Systematic * Composite * Stratified   + Raw quality milk tests * Resazurin * Alcohol * Lactometer * Clot on boiling * Sediment * Pesticide residues * Antibiotic residues * Antimicrobial residue test * pH * Aflatoxin * Freezing point * Mastitis * Formaldehyde * Peroxide | * Observation * Written tests * Oral questions * Third party report |
| 1. Complete raw milk procurement | * + Record keeping   + Documentation   + Communication | * 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 milk procurement system should have the following:** | | |
| * Calculator * Quantity measurement devices * Quality testing equipment and tools * Stationery | * Cleaning tools * Sampling equipment * Computer * Protective clothing * Printers * Survey tool | * Means of transport * Internet |

# RAW MILK CHILLING

**UNIT CODE:** DA/CU/PM/CR/02/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Chill raw milk

**Duration of Unit:** 128 hours

**Unit Description**

This unit specifies the competencies required to chill raw milk. It involves applying food safety measures in raw milk quality and quantity assessment; bulking and cooling; equipment cleaning and record keeping.

**Summary of Learning Outcomes**

* 1. Conduct food safety risk assessment to chill raw milk
  2. Prepare to chill raw milk
  3. Chill raw milk
  4. Evaluate raw milk chilling
  5. Complete raw milk chilling

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to chill raw milk | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Practical report * Third party report |
| 1. Prepare to chill raw milk | * + Sampling procedures   + Raw milk quality is tests   + Microbial growth   + Quantity measurement | * Written tests * Observation * Oral questions * Third party report |
| 1. Chill raw milk | * + Milk bulking   + Milk chilling methods   + Good manufacturing practices (GMP)   + Cooling operation | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate raw milk chilling | * + Sampling procedures * Random * Systematic * Composite * Stratified   + Raw milk quality tests * Resazurin * Alcohol * Lactometer * Clot on boiling * Antibiotic residues * Pesticide residues * Antimicrobial residue test * Acidity * pH * Sediment * Aflatoxin * Freezing point * Total Viable Count * Total Plate Count * Mastitis   + Efficiency of cleaning * Equipment swabs * Rinse test | * 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/03/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process fluid milk products

**Duration of Unit:** 128 hours

**Unit Description**

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

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to process fluid milk products
2. Prepare to process fluid milk products
3. Process fluid milk products
4. Evaluate fluid milk products processing
5. Complete fluid milk products processing

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to process fluid milk products | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Practical report * Third party report |
| 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   + Production economics   + Sampling methods * Random * Systematic * Composite * Stratified   + Good Manufacturing Practices   + Good Laboratory Practices | * Written tests * Observation * Oral questions * Third party report |
| 1. Process fluid milk products | * + Dairy chemistry   + Dairy microbiology   + Milk separation and standardization   + Milk homogenization   + Milk heat treatment   + Milk packaging and storage   + Food nutrition   + Dairy engineering | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate fluid milk products processing | * + Fluid milk product quality control and assurance     - Phosphatase test     - Peroxidase test     - Turbidity test     - Coliforms test     - Total plate count     - Packaging integrity test     - Titratable acidity     - Accelerated shelf life test | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Complete fluid 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 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/04/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process fermented milk products

**Duration of Unit:** 192 hours

**Unit Description**

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

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to process fermented milk products
2. Prepare to process fermented milk products
3. Process fermented milk products
4. Evaluate fermented milk products processing
5. Complete fermented milk products processing

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to process fermented milk products | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Practical report * Third party report |
| 1. Prepare to process fermented milk products | * + Fermented milk products historical background.   + Types of Fermented milk products     - Yoghurt     - Fermented (cultured) milk     - Probiotics milk   + Fermented milk products processing equipment and tools   + Production economics   + Sampling methods     - Random     - Systematic     - Stratified   + Good Manufacturing Practices   + Good laboratory practices | * Written tests * Observation * Oral questions * Third party report |
| 1. Process fermented milk products | * + Milk separation and standardization   + Milk homogenization   + Milk heat treatment   + Food ingredients and additives   + Dairy chemistry   + Dairy microbiology   + Dairy Starter cultures   + Milk fermentation   + Yoghurt production   + Fermented (Cultured) milk production   + Probiotic milk production.   + Milk packaging and storage   + Food nutrition   + Dairy engineering | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate fermented milk products processing | * + Fermented milk product quality control and assurance     - Acidity/pH     - Coliforms test     - Yeast and molds     - Sensory evaluation     - Viscosity test     - Activity test | * Observation * Product analysis * 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 |

# CONCENTRATED MILK PRODUCTS PROCESSING

**UNIT CODE:** DA/CU/PM/CR/05/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Process concentrated milk products

**Duration of Unit:** 128 hours

**Unit Description**

This unit specifies the competencies required to process concentrated milk products. It involves applying food safety measures to process concentrated milk products, determining product to produce, raw material and equipment assembly, quality assessments, processing, packaging, storage, record keeping, cleaning of plant and equipment and waste management.

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to process concentrated milk products
2. Prepare to process concentrated milk products
3. Process concentrated milk products
4. Evaluate concentrated milk products processing
5. Complete concentrated milk products processing

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to process concentrated milk products | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Third party report * Practical report |
| 1. Prepare to process concentrated milk products | * + Concentrated milk products historical background.   + Types of Concentrated milk products     - Sweetened condensed milk     - Evaporated/unsweetened milk     - Dried milk     - Whey powder     - Condensed butter milk   + Concentrated milk products processing equipment and tools   + Production economics   + Sampling techniques     - Random     - Stratified     - Systematic     - Composite   + Good Manufacturing Practices   + Good laboratory practices | * Written tests * Observation * Oral questions * Third party report |
| 1. Process concentrated milk products | * + Milk separation and standardization   + Milk homogenization   + Milk heat treatment   + Food ingredients and additives   + Dairy chemistry   + Milk evaporation   + Milk drying   + Sweetened condensed milk production   + Evaporated milk production   + Dried milk production.   + Milk packaging and storage   + Food nutrition   + Dairy engineering   + Dairy microbiology | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate concentrated milk products processing | * + Concentrated milk product quality control and assurance     - Bulk density     - Solubility index     - Yeast and molds     - Sensory evaluation     - Moisture content | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Complete concentrated 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 concentrated milk production should have the following:** | | |
| * Weighing balance * Computer software * Heat exchangers * Milk evaporators * Milk driers * Packaging equipment and materials * Test Equipment and apparatus | * Incinerator * Calculator * Cleaning tools * Cleaning agents and sanitizers * Potable water * Computer * Protective clothing * Operation tools * Printers | * Testing reagents * Sweeteners * Land fill * KEBS standards * Milk processing manual * Sampling equipment * Stationery * Internet |

# FAT BASED MILK PRODUCTS PROCESSING

**UNIT CODE:** DA/CU/PM/CR/06/6/B

**Relationship to Occupational Standards**

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

**Duration of Unit:** 192 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, determining product to produce, raw material and equipment assembly; quality assessments, processing, packaging and storage; record keeping, cleaning of plant and equipment and waste management.

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to process fat based milk products
2. Prepare to process fat based milk products
3. Process fat-based milk products
4. Evaluate fat based milk products processing
5. Complete fat-based milk products processing

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to process fat-based milk products | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on procuring 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 * Practical report * Third party report |
| 1. Prepare to process fat based milk products | * + Fat based products historical background.   + Types of Fat based milk products     - Cream     - Butter     - Anhydrous milk fat     - Ice cream     - Fat based products substitutes   + Fat based milk products production equipment and tools   + Production economics   + Sampling techniques   + 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   + Dairy chemistry   + Cream production   + Butter production   + Anhydrous milk fat production.   + Ice cream production   + Fat based product substitutes   + Milk packaging and storage   + Food nutrition   + Dairy engineering   + Dairy microbiology | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate fat based milk products processing | * + Fat based milk product quality control and assurance     - Butter fat     - Moisture content     - Salt content     - Overrun     - Acidity/pH     - Sensory evaluation | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Complete fat-based 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 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/07/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Produce cheese

**Duration of Unit:** 192 hours

**Unit Description**

This unit specifies the competencies required to produce ripened and unripened cheese. It involves applying food safety measures to produce cheese, determining type of cheese to produce; quality assessments; processing technologies; packaging, and storage; record keeping; equipment cleaning and waste management.

**Summary of Learning Outcomes**

1. Conduct food safety risk assessment to produce ripened and unripened cheese
2. Prepare to produce ripened and unripened cheeses
3. Produce ripened and unripened cheeses
4. Evaluate ripened and unripened cheeses processing
5. Complete ripened and unripened cheeses processing

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct food safety risk assessment to produce cheese | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + 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 * Practical report * Third party report |
| 1. Prepare to produce   ripened and unripened  cheeses | * + Ripened and unripened cheeses historical background.   + Types of cheese and classification * Ripened * Unripened cheeses   + Cheese production equipment and tools   + Production economics   + Sampling techniques * Random * Stratified * Systematic * Composite   + Good Manufacturing Practices   + Good laboratory practices | * Written tests * Observation * Oral questions * Third party report |
| 1. Produce ripened and unripened cheeses | * + Milk separation and standardization   + Milk preparation and heat treatment   + Cheese ingredients and additives   + Dairy chemistry   + Dairy microbiology   + Dairy Starter cultures   + Milk coagulants   + Milk fermentation and coagulation   + General cheese manufacturing principles.   + Ripened cheese production * Cheddar * Gouda   + Unripened cheese production * Cottage * Queso Blanco * Mozzarella * Feta * Cream cheese   + Cheese packaging and storage   + Food nutrition   + Dairy engineering | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Evaluate ripened and   unripened cheeses  processing | * + Ripened and unripened cheese quality control and assurance * Moisture content * Butterfat content * Sensory evaluation * Yeast and molds * Coliform enumeration   HACCP Plan | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Complete ripened and   unripened cheeses  processing | * + 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 |

# DAIRY PRODUCTS QUALITY CONTROL

**UNIT CODE:** DA/CU/PM/CR/08/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Control quality of dairy products

**Duration of Unit:** 256 hours

**Unit Description**

This unit specifies the competencies required to control quality of dairy products. It involves applying food safety measures to control quality of dairy products, determining product standards; developing quality control criteria; assessing dairy products, environment, equipment, water and packaging materials; cleaning quality control facilities; managing laboratory waste; and record keeping.

**Summary of Learning Outcomes**

1. Apply food safety measures to control quality of dairy products
2. Prepare to control quality of dairy products
3. Control quality of dairy products
4. Evaluate quality control of dairy products
5. Complete quality control of dairy products

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to control quality of dairy products | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning, importance, categories and establishment of prerequisite programmes   + Relevant programmes     - Good laboratory practices     - Good manufacturing practices     - Standard Sanitary Operating Procedures * Hazard analysis   + Enterprise description - Layout of premises and surrounding environment   + Product description   + Methods of distribution and storage of product   + Intended uses and consumers   + Developing flow diagram   + Identification of hazards at each step of the flow diagram   + Describing the hazard   + Significance of hazards * Establishment of the HACCP plan   + Identifying critical control points   + Procedures of setting up critical control limits   + Establishment of monitoring procedures on the control limits   + Establishment of corrective actions   + Verification and validation procedures   + Record keeping * Standards and legislations in food safety on controlling quality of dairy products   + Code of hygienic practices for milk and milk products   + 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 * Third party report * Practical report |
| 1. Prepare to control quality of dairy products | * + Verification and calibration of laboratory equipment   + Sampling methods for dairy products   + Quality tests for dairy products * Compositional * Microbial   + Reagent preparation   + Media and materials for microbial analysis * General purpose media * Selective media * Differential media * Diluents   + Media, equipment and apparatus preparation and sterilization   + Laboratory safety | * Written tests * Observation * Oral questions * Third party report |
| 1. Control quality of dairy products | * + Quality control of:   + Raw milk   + Fluid milk   + Fermented milk products   + Fat based milk products   + Concentrated dairy products   + Ripened and unripened cheese   + Water * Dairy equipment swab * Dairy environment air count | * Observation * Product analysis * Written tests * Oral questions * Third party report |
| 1. Evaluate control of quality | * + Quality assurance procedures * Hazard analysis critical control points (HACCP) * Standardization (KEBS, ISO) * Codes of practice | * Observation * Written tests * Oral questions * Third party report |
| 1. Complete control of quality | * + 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**

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| --- | --- | --- |
| **Functional quality control facility should have the following but not limited to:** | | |
| * Laboratory * Judging and grading facility * Microbial media * Weighing balance * Weighing scale * Test Equipment and apparatus * Sampling equipment | * Measuring cylinder * Incinerator * Calculator * Cleaning tools * Cleaning agents and sanitizers * Portable water * Stationery * Computer | * Protective clothing * Printers * Internet * Testing reagents * Refrigerator * Autoclave |

# DAIRY BUSINESS MANAGEMENT

**UNIT CODE:** DA/CU/PM/CR/09/6/B

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Manage a dairy plant business

**Duration of Unit:** 64 hours

**Unit Description**

This unit specifies the competencies required to manage a dairy business. It involves applying food safety measures to manage a dairy plant business, planning, controlling, coordinating, organizing, directing and documenting dairy business.

**Summary of Learning Outcomes**

* 1. Applying food safety measures to manage a dairy plant business
  2. Prepare to manage Dairy business
  3. Manage dairy business
  4. Evaluate management of dairy business
  5. Complete management of dairy business

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

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Apply food safety measures to dairy plant business | * Meaning of food safety * Importance of food safety * Principles of food safety * Prerequisite programmes   + Meaning and importance of prerequisite programmes   + Relevant programmes     - Good agricultural 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 | * Written tests * Oral questioning * Observation * Third party report |
| 1. Prepare to manage Dairy business | * Development of business plan * Strategic planning * Budgeting * Work planning * Procurement * Recruitment of labour. * Information Management Systems | * Written tests * Observation * Oral questions * Third party report |
| 1. Manage dairy business | * + Production   + Coordination   + Duty allocation   + Remuneration   + Marketing   + Public relation | * Observation * Written tests * Oral questions * Third party report |
| 1. Evaluate management of dairy business | * + Financial management   + Monitoring and evaluation | * Observation * Written tests * Oral questions * Third party report |
| 1. Complete dairy business | Record keeping and documentations | * 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** Managing Dairy Business **should have the following:** | | |
| * Processing equipment * Labour * Offices and furniture | * Stationery * Computer | * Printers * Internet |