THE KISII NATIONAL POLYTECHNIC

P.O. BOX 222-40200,

KISII, KENYA.

COMPETENCY BASED CURRICULUM

FOR

CERTIFICATE IN DAIRY PLANT MANAGEMENT

LEVEL 5

TABLE OF CONTENT

COURSE OVERVIEW

This course is designed to equip an individual with competencies for supervision of operations in a dairy plant. It entails procuring and chilling raw milk; processing fluid milk, fermented milk products, fat-based milk products and concentrated milk products and producing cheese.

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

Basic Units of Learning

Unit Code	Unit Title	Duration in Hours	Credits
KNP/DPM/B001/5	Communication skills	25	2.5
KNP/DPM/B002/5	Basic Mathematics	40	4
KNP/DPM/B003/5	Introduction to computer	45	4.5
KNP/DPM/B004/5	Entrepreneurial skills	70	7
KNP/DPM/B005/5	Environmental literacy	25	2.5
KNP/DPM/B006/5	Occupational safety and health practices	25	2.5
	Total	**230**	**23**

Core Units of Learning

Unit Code	Unit Title	Duration in Hours	Credits
KNP/DPM/C001/5	Milk reception and platform test	40	4
KNP/DPM/C002/5	Raw milk chilling	70	7
KNP/DPM/C003/5	Fluid milk products processing	140	14
KNP/DPM/C004/5	Introduction to dairy microbiology	120	12
KNP/DPM/C005/5	Fermented milk products	140	14
KNP/DPM/C006/5	Concentrated milk products	120	12
KNP/DPM/C007/5	Fat based milk products	140	14
KNP/DPM/C008/5	Cheese production	140	14
	Attachment	**360**	**36**
	Grand Total	**1500**	**155**

The total duration of the course for an average trainee is 1500 hours which is equivalent to 50 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:

a) Kenya Certificate of Secondary Education (KCSE) mean grade D (Plain).

Or

b) Dairy Plant Management Artisan Certificate (Level 4).

Or

c) 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 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:

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

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 5, an individual must demonstrate competence in all the units of competency.

These certificates will be awarded by Kisii National Polytechnic.

BASIC UNITS OF LEARNING

COMMUNICATION SKILLS

UNIT CODE: KNP/DPM/B001/5

Relationship to Occupational Standards
This unit addresses the unit of competency: Demonstrate communication skills

Duration of Unit: 25 hours

Unit Description
This unit describes the competencies required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate discussion with groups and contribute to the development of communication strategies.

Summary of Learning Outcomes

1. Meet communication needs of clients and colleagues
2. Contribute to the development of communication strategies
3. Conduct interviews
4. Facilitate group discussions
5. 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)	• Observation • Oral

	• Workplace etiquette • Ethical work practices in handling communication • Active listening • Feedback • Interpretation • Flexibility in communication	
2. Contribute to the development of communication strategies	• Dynamics of groups • Styles of group leadership • Openness and flexibility in communication • Communication skills relevant to client groups	• Written • Observation
3. Conduct interviews	• Types of interview • Establishing rapport • Facilitating resolution of issues • Developing action plans	• Written • Observation
4. Facilitate group discussions	• Identification of communication needs • Dynamics of groups • Styles of group leadership • Presentation of information • Encouraging group members participation • Evaluating group communication strategies	• Written • Observation
5. Represent the organization	• Presentation techniques • Development of a presentation • Multi-media utilization in presentation • Communication skills relevant to client groups	• Observation • Written

Suggested Delivery Methods

- Role playing

- Observation
- Viewing of related videos

Recommended Resources

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

BASIC MATHEMATICS

UNIT CODE: KNP/DPM/B002/5

Relationship to Occupational Standards:
This unit addresses the unit of competency: Demonstrate numeracy skills

Duration of Unit: 40 hours

Unit Description
This unit covers the competencies required to perform numerical functions. The person who is competent in this unit shall be able to: Calculate with whole numbers and familiar fractions, decimals and percentages for work; Estimate, measure, and calculate with routine metric measurements for work; Use routine maps and plans for work; Interpret, draw and construct 2D and 3D shapes for work; Interpret routine tables, graphs and charts for work; Collect data and construct routine tables and graphs for work; and Use basic functions of calculator

Summary of Learning Outcomes

1. Calculate with whole numbers and familiar fractions, decimals and percentages for work
2. Estimate, measure and calculate with routine metric measurements for work
3. Use routine maps and plans for work
4. Interpret, draw and construct 2D and 3D shapes for work
5. Interpret routine tables, graphs and charts for work
6. Collect data and construct routine tables and graphs for work
7. Use basic functions of calculator

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Calculate with whole numbers and familiar fractions, decimals and percentages for work	• Interpretation of whole numbers, fractions, decimals, percentages and rates • Calculations involving several steps • Calculation with whole numbers and routine or familiar fractions, decimals and percentages	• Oral • Written • Practical test • Observation

	• Conversion between equivalent forms of fractions, decimals and percentages • Application of order of operations to solve multi-step calculations • Application of problem solving strategies • Making estimations to check reasonableness of problem solving process, outcome and its appropriateness to the context and task • Use of formal and informal mathematical language and symbolism to communicate the result of a task	
2. Estimate, measure and calculate with routine metric measurements for work	• Selection and interpretation of measurement information in workplace tasks and texts • Identification and selection of routine measuring equipment • Estimation and making measurements using correct units • Estimation and calculation using routine measurements • Performing conversions between routinely used metric units • Using problem solving processes to undertake tasks • Recording information using mathematical language and symbols	• Oral • Written • Practical test • Observation
3. Use routine maps and plans 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	• Oral • Written • Practical test • Observation

	• 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	
4. Interpret, 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 • Use formal and informal mathematical language to describe and compare common angles • Use common geometric instruments to draw two dimensional shapes • Construct routine three dimensional objects from given nets	
5. Interpret routine tables, graphs and charts for work	• Identify routine tables, graphs and charts in predominately familiar texts and contexts • Identify common types of graphs and their different uses	• Oral • Written • Practical test • Observation

	• Identify features of tables, graphs and charts • Locate specific information • Perform calculations to interpret information • Explain how statistics can inform and persuade • Identify misleading statistical information • Discuss information relevant to the workplace	
6. Collect data and construct routine tables and graphs for work	• Identify features of common tables and graphs • Identify uses of different tables and graphs • Determine data and variables to be collected • Determine audience • Select a method to collect data • Collect data • Collate information in a table • Determine suitable scale and axes • Draft and draw graph to present information • Check that data meets the expected results and context • Report or discuss information using formal and informal mathematical language	• Oral • Written • Practical test • Observation
7. Use basic functions of calculator	• Identify and use keys for basic 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	• Oral • Written • Practical test • Observation

	• Interpret display and record result • Make estimations to check reasonableness of problem-solving process, outcome and its appropriateness to the context and task • Use formal and informal mathematical language and appropriate symbolism and conventions to communicate the result of the task	

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
- Internet

INTRODUCTION TO COMPUTER

UNIT CODE: KNP/DPM/B003/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Demonstrate computer literacy

Duration of Unit: 45 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
2. 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

3. 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
4. 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
5. 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
6. 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

ENTREPRENEURIAL SKILLS

UNIT CODE: KNP/DPM/B004/5

Relationship to occupational standards

This unit addresses the unit of competency: Demonstrate entrepreneurial skills

Duration of unit: 70 hours

Unit description

This unit describes the competencies critical to demonstration of entrepreneurial aptitudes. It involves, developing business innovation strategies, developing new markets, customer base, expanding employed capital and undertaking regional/county expansion while retaining motivated staff.

Summary of Learning Outcomes

1. Develop business innovation strategies
2. Develop new products/ markets
3. Expand customers and product lines
4. Motivate all staff/workers
5. Expand employed capital base
6. Undertake regional/county business expansion

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Develop business Innovation strategies	• Innovation in business • Business innovation strategies • Creativity for business development • New technologies in entrepreneurship • Linkages with other entrepreneurs • Setting strategic directions • New ideas and approaches	• Observation • Case studies • Individual/group assignments • Projects • Written • Oral

	• Entrepreneurial skills development • Market trends • Monitoring and anticipating market trends • Products and processes in entrepreneurship • Business conventions ad exhibitions • Business growth refocus	
2. Develop new products/ markets	• Feasibility study for new products • Identifying new sources of raw material and resources • New target markets/customers • Increasing products and services • Marketing improvement • Intrapreneurship and business growth	• Observation • Case studies • Individual/group assignments • Projects • Written • Oral
3. Expand customers and product lines	• Market demand • Regulatory environment • Creating product and services competitive advantages • Creating royal client base • Identifying and maintain new customers and markets • Advance product/ service promotions • Advance market expansion • Small business records management • Book keeping and auditing for small businesses	• Oral • Observation • Case studies • Individual/group assignments • Projects • Written

	• Computer application software and programmes • ICT in customer and product diversification	
4. Motivate staff/workers	• Motivation of workers • Communication at workplace for motivation purpose • Problem solving • Conflict resolution at place of work • Good staff/workers relation • Team building and team work • Staff development and enhancement • Culture of continuous improvement	• Observation • Case studies • Individual/group assignments • Projects • Written
5. Expand employed capital base	• Employed capital in business • Business share holdings • Types of shares • Shares diversification • Role of shareholders • Entrepreneurship • Increasing products and services	• Observation • Case studies • Individual/group assignments • Projects • Written • Oral
6. Undertake county/ regional business expansion	• Region/ county identification process • Regional/ county laws and regulation • Business regional/county expansion • Regional/ County business expansion • Innovation in business	• Observation • Case studies • Individual/group assignments • Projects • Written • Oral

	• Business expansion and diversification • Resources for regional/county expansion • Small business Strategic Plan • Computer software in business development • ICT and business growth	

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
- Laptop/ desktop computers
- Internet
- Telephone
- Writing materials

ENVIRONMENTAL LITERACY

UNIT CODE: KNP/DPM/B005/5

Relationship to Occupational Standards
This unit addresses the unit of competency: Demonstrate environmental literacy

Duration of Unit: 25 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 and monitor activities on environmental protection/programs.

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

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	• Written questions • Oral questions • Observation of work procedures

	• Types and uses of PPE in line with environmental regulations • Occupational Safety and Health Standards (OSHS)	
2. 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
3. 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
4. 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	• Written questions • Oral questions • Observation of work procedures • Role play

	• Identification of areas for improvement	
5. 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
6. Implement specific environmental programs	• Community needs and expectations • Resource availability • 5 s of good housekeeping • Identification of programs/Activities • Setting of individual roles /responsibilities • Resolving problems /constraints encountered • Consultation with stakeholders	• Written questions • Oral questions • Observation of work procedures • Role play
7. 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

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
- Environmental Management and Coordination Act 1999
- Machine/equipment manufacturer's specifications and instructions
- Personal Protective Equipment (PPE)
- ISO standards
- Ccompany environmental management systems (EMS)
- Montreal Protocol
- Kyoto Protocol

OCCUPATIONAL SAFETY AND HEALTH PRACTICES

UNIT CODE:KNP/DPM/B006/5

Relationship to Occupational Standards
This unit addresses the unit of competency: Demonstrate occupational safety and health practices

Duration of Unit: 25 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 is conducted by • Authorized personnel or agency • Gathering of OHS issues and/or concerns raised	• Oral questions • Written tests • Observation of trainees identify hazards and risks
2. Identify and implement appropriate control measure to hazards and risks	• Prevention and control measures, including use of PPE (personal protective equipment) for specific hazards are identified and implemented	• Oral questions • Written tests • Practical test • Observation of implementation of control measures

	• Appropriate risk controls based on result of OSH hazard evaluation is recommended • Contingency measures, including emergency procedures during workplace incidents and emergencies are recognized and established in accordance with organization procedures	
3. Implement OSH programs, procedures and policies/guidelines	• Providing information to work team about company OHS program, procedures and policies/guidelines • Participating in 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

MILK RECEPTION AND PLATFORM TEST

UNIT CODE: KNP/DPM/C001/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Procure raw milk

Duration of Unit: 32 hours

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

Summary of Learning Outcomes
1. Carry out 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. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	○ 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)	
2. 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
3. Procure raw milk	• Milk collection systems • Milk transportation • Good manufacturing practices (GMP) • Methods of quantity measurements	• Observation • Written tests • Oral questions • Third party report
4. Evaluate raw milk procurement	• Sampling procedures ○ Random ○ Systematic ○ Composite ○ Stratified • Raw quality milk tests ○ Resazurin ○ Alcohol ○ Lactometer ○ Clot on boiling ○ Sediment ○ Antibiotic ○ Antimicrobial residue test ○ pH ○ Aflatoxin ○ Freezing point ○ Mastitis ○ Formaldehyde ○ Peroxide	• Observation • Written tests • Oral questions • Third party report

5. 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: KNP/DPM/C002/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Chill raw milk

Duration of Unit: 64 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. Carry out 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. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	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)	
2. Prepare to chill raw milk	• Sampling procedures • Raw milk quality is tests • Microbial growth • Quantity measurement	• Written tests • Observation • Oral questions • Third party report
3. Chill raw milk	• Milk bulking • Milk chilling methods • Good manufacturing practices (GMP) • Cooling operation	• Observation • Written tests • Oral questions • Third party report
4. Evaluate raw milk chilling	• Sampling procedures ○ Random ○ Systematic ○ Composite ○ Stratified • Raw quality milk tests ○ Resazurin ○ Alcohol ○ Lactometer ○ Clot on boiling ○ Antibiotic ○ 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
5. 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

UNIT CODE: KNP/DPM/C003/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Process Fluid Milk Products

Duration of Unit: 96 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. Carry out food safety risk assessment to process fluid milk products
2. Prepare 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. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	○ 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)	
2. Prepare process fluid milk products	a. Types of Fluid milk products i. Pasteurised ii. Extended shelf life iii. Ultra-heat treated (UHT) b. Fluid milk products processing equipment and tools c. Production economics • Sampling techniques ○ Random ○ Systematic ○ Composite ○ Stratified d. Good Manufacturing Practices e. Good Laboratory practices	• Written tests • Observation • Oral questions • Third party report
3. 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
4. Evaluate fluid milk products processing	• Fluid milk product quality control and assurance ○ Phosphatase test ○ Peroxidase test ○ Turbidity test ○ Coliforms test	• Observation • Product analysis • Written tests

	○ Total plate count ○ Packaging integrity test ○ Accelerated shelf life test	• Oral questions • Third party report
5. 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

UNIT CODE: KNP/DPM/C004/5

Relationship to Occupational Standards

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

Duration of Unit: 128 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. Carry out 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

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Practical report
		• Third party report
		• Case study

	○ 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)	
2. Prepare to process fermented milk products	• Fermented milk products historical background. • Types of Fermented milk products ○ Yoghurt ○ Cultured buttermilk ○ Probiotics milk • Fermented milk products processing equipment and tools • Production economics • Sampling techniques ○ Random ○ Systematic ○ Stratified • Good Manufacturing Practices • Good Laboratory Practices	• Written tests • Observation • Oral questions • Third party report
3. 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 • Cultured buttermilk production • Probiotic milk production. • Milk packaging and storage • Food nutrition • Dairy engineering	• Observation • Written tests • Oral questions • Third party report
4. Evaluate fermented milk	• Fermented milk product quality control and assurance ○ Acidity/pH	• Observation • Product analysis

products processing	○ Coliforms test ○ Yeast and molds ○ Sensory evaluation ○ Viscosity test ○ Activity test	• Written tests • Oral questions • Third party report
5. Complete fermented 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 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

UNIT CODE: KNP/DPM/C005/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Process concentrated milk products

Duration of Unit: 96 hours

Unit Description
This unit specifies the competencies required to process concentrated milk products. It involves determining product to produce, applying food safety measures in 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. Carry out 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 processing of concentrated milk products

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	○ 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)	

2. Prepare to process concentrated milk products	• Concentrated milk products historical background.
	• Types of Concentrated milk products
	  ○ Sweetened condensed milk
	  ○ Evaporated/unsweetened milk
	  ○ Dried 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

3. 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

4. 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
5. Complete processing of concentrated 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 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

UNIT CODE: KNP/DPM/C006/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Process fat-based milk products

Duration of Unit: 128 hours

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

Summary of Learning Outcomes

1. Carry out 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. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	○ 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)	
2. Prepare to process fat based milk products	• Fatbased products historical background. • Types of Fatbased milk products ○ Cream ○ Butter ○ Anhydrous milk fat ○ Ice cream ○ Fatbased products substitutes • Fatbased milk products production equipment and tools • Production economics • Sampling techniques • Good Manufacturing Practices	• Written tests • Observation • Oral questions • Third party report
3. 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 • Fatbased product substitutes • Milk packaging and storage • Food nutrition • Dairy engineering • Dairy microbiology	• Observation • Written tests • Oral questions • Third party report
4. Evaluate fat based milk products processing	• Fat based milk product quality control and assurance ○ Butter fat ○ Moisture content ○ Salt content ○ Overrun	• Observation • Product analysis • Written tests

	○ Acidity/pH ○ Sensory evaluation	• Oral questions • Third party report
5. 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: KNP/DPM/C007/5

Relationship to Occupational Standards
This unit addresses the Unit of Competency: Produce cheese

Duration of Unit: 128 hours

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

Summary of Learning Outcomes

1. Carry out food safety risk assessment to produce cheese
2. Prepare to produce ripened and unripened cheese
3. Produce ripened and un-ripened cheese
4. Evaluate cheese production
5. Complete cheese production

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Carry out 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
		• Written tests
		• Oral questioning
		• Observation
		• Case study
		• Practical report
		• Third party report

	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)	
2. Prepare to produce ripened and unripened cheese	• 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
3. Produce ripened and un-ripened cheese	• 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	• Observation • Product analysis • Written tests • Oral questions • Third party report

	○ Mozzarella ○ Feta ○ Cream cheese • Cheese packaging and storage • Food nutrition • Dairy engineering	
4. Evaluate cheese production	• Ripened and unripened cheese quality control and assurance ○ Moisture content ○ Butterfat content ○ Sensory evaluation ○ Yeast and molds ○ Coliform enumeration	• Observation • Product analysis • Written tests • Oral questions • Third party report
5. Complete cheese production	• 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	• Measuring cylinder • Incinerator	• Testing reagents • Food colours

• Cold room • Cheese vats • Cheese knives • Stirrer and strainers • Cheese cloth • Cheese moulds • Cheese press • Cheese coating • Packaging equipment and materials • Internet	• Calculator • Cleaning tools • Cleaning agents and sanitizers • Potable water • Computer • Protective clothing • Operation tools • Printers • Sampling equipment • Stationery	• Salts • Land fill • KEBS standards • Milk processing manual • Test Equipment and apparatus • Test Equipment and apparatus