FUNDAMENTALS OF DAIRY TECHNOLOGY

ISCED UNIT CODE: 0721 451 05A

TVET CDACC UNIT CODE: DA/CU/PM/CC/01/5/MA

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply Fundamentals of Dairy Technology

Duration: 120 Hours

Unit Description

This unit specifies the competencies required to apply fundamentals of dairy technology. It involves application milk composition and dairy microbiology knowledge and also dairy equipment operations principles

Summary of Learning Outcomes

By the end of this unit, the learner should be able to:

S/No	Learning Outcomes	Duration (Hours)
1.	Apply Milk Composition Knowledge	**30**
2.	Apply dairy microbiology knowledge	**40**
3.	Apply Dairy equipment operational Principles	**50**
Total		**120**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcomes	Content	Suggested Assessment Methods
1. Apply Milk Composition Knowledge	5.1 Milk Composition 5.1.1 Definition of terms 5.1.2 Milk Composition 5.1.3 Factors affecting milk composition 1.1.1.1 Management Factors	• Written tests • Practical • Interviews/ Oral questions • Individual/group assignments

	1.1.1.1 Biological Factors 1.1.1.1 Milk Adulteration 5.2 Physical Properties of milk 5.2.1 Colour 5.2.2 Taste 5.2.3 Density 5.2.4 Viscosity 5.2.5 Freezing point 5.3 Chemical Properties 5.3.1 pH 5.3.2 Enzymes 5.3.3 Emulsions 5.3.4 Heat sensitivity 5.4 Smart and Sustainable Systems 5.4.1 AI application 5.4.2 Sustainable waste disposal	
2. Apply dairy microbiology knowledge	2.1 Introduction to Microbiology 2.1.1 Definition of terms 2.1.2 Role of microbiology in dairy processing 2.1.2.1 Milk Preservation 2.1.2.2 Milk safety 2.1.2.3 Fermentation 2.1.2.4 Waste management 2.1.3 Classification of Micro organism 2.1.3.1 Bacteria 2.1.3.2 Moulds	• Written tests • Interviews/ Oral questions • Practical • Individual/group assignments • Case Studies

	2.1.3.3 Yeast 2.2 Microbiological apparatus 2.2.1 Microscope 2.2.2 Incubators 2.2.3 Autoclave 2.3 Microscopy Procedures 2.3.1 Sampling 2.3.2 Slide Preparation 2.3.3 Staining 2.3.4 Culturing 2.3.5 enumeration 2.3.6 Observation 2.3.7 Documentation 2.4 Hygiene and sanitation 2.4.1 Sanitation procedures 2.5 Waste Management 2.5.1 Definition of terms 2.5.2 Waste segregation 2.5.3 Handling of bio hazards 2.5.4 Methods of waste management 2.5.5 Importance of waste management 2.6 Smart and Sustainable Systems 2.6.1 AI application 2.6.2 Sustainable waste disposal	
3. Apply Dairy equipment operational Principles	3.1 Dairy Equipment and Machinery 3.1.1 Definition of terms 3.1.2 Operational parameters	• Written tests • Practical

	3.1.3 Operational Processes 3.1.4 Maintenance 3.1.5 Operations principles and maintenance of dairy processing equipment and machinery 3.1.6 Types of Dairy Equipment's and Machinery 3.1.6.1 Milk separator 3.1.6.2 Milk homogenizer 3.1.6.3 Heat exchanger 3.1.6.4 Vats 3.1.6.5 Milk coolers 3.1.6.6 Milk Pumps 3.1.6.7 Milk filters 3.1.6.8 Butter churn 3.1.6.9 Ice cream freezer 3.2 Packaging equipment Operations and maintenance of Dairy Utilities and services 3.2.1 Steam boiler 3.2.2 Electricity 3.2.3 Water 3.2.4 Waste water system 3.2.5 Refrigeration equipment 3.3 Smart and Sustainable Systems 3.3.1 AI application 3.3.2 Sustainable waste disposal 3.3.3 Eco friendly dairy plant utilities	• Interviews/ Oral questions • Individual/group assignments • Case Studies

Suggested Methods of Instruction

- Demonstrations
- Role playing
- Group discussion
- Direct instruction
- Question and Answer
- Snow balling

Recommended Resources for 25 trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
1.	Textbooks		5 pcs	1:5
2.	Production Manuals		5	1;5
3.	PowerPoint presentations	For trainer's use		
4.	Projector		1	1;25
5.	Assorted Flash Cards		5	1;5
6.	Whiteboard		1	1;25
7.	Rolls flip charts		1	1;25
8.	Assorted colour of whiteboard markers	For trainers Use		
B	**Learning Facilities & infrastructure**			
1.	Lecture/theory room		1	1:25
2.	Workshop		1	1:25
3.	Laboratory		1	1:25
4.	Site		1	1:25
C	**Consumable materials**			
1.	Iodine			1:5
2.	Crystal violet		25 pcs	1:1
3.	Safranin			
4.	Ethanol/acetone			
5.	Iodine			
6.	Milk /product samples		500ml	500mls:5

D	Tools and Equipment			
1.	Microscope		5 pcs	1:5
2.	Microscope slides		50 pcs	2:1
3.	Heat exchanger		1 pcs	1:25
4.	Vats		5 pcs	1:5
5.	Refrigeration Equipment's		1 pcs	1:25
6.	Milk separator		1 pcs	1:25
7.	Milk homogenizer		1 pcs	1:25
8.	Heat exchanger		1 pcs	1:25
9.	Vats		1 pcs	1:25
10.	Milk coolers		1 pcs	1:25
11.	Milk Pumps		1 pcs	1:25
12.	Milk filters		1 pcs	1:25
13.	Butter churn		1 pcs	1:25
14.	Ice cream freezer		1 pcs	1:25
15.	Packaging equipment		1 pcs	1:25