REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

AGRICULTURAL ENGINEERING

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0716 554 A

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

FARM MACHINERY AND EQUIPMENT OPERATION

UNIT CODE: 0716 451 07A

TVET CDACC UNIT CODE: ENG/CU/AGR/CR/02/5/MA

UNIT DURATION: 240 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency: **Operate farm machinery and equipment**

Unit Description

This unit specifies the competencies required by an Agricultural Engineering Technologist Level 6 to operate farm machinery and equipment. It involves operating tillage, planting crop protection, harvesting and agro-processing equipment and machinery.

Summary of Learning Outcomes

S/No.	Learning Outcomes	Duration (Hours)
1.	Operate tillage equipment and machinery	80
2.	Operate planting equipment and machinery	40
3.	Operate crop protection equipment and machinery	40
4.	Operate harvesting machinery and equipment	40
5.	Operate agro-processing machinery and equipment	40
TOTAL		**240**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Operate tillage equipment and machinery	1.1 Primary tillage equipment 1.1.1 Disc plough 1.1.2 Mouldboard plough 1.1.3 Subsoiler 1.1.4 Chisel plough 1.1.5 Rotavator	• Practical • Project • Portfolio of evidence • Written tests • Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	1.2 Elements of periodically maintaining primary tillage machinery and equipment 1.3 Land Secondary and Tertiary Tillage Equipment and Machinery e.g. 1.3.1 Roller 1.3.2 Cultivators 1.3.3 Rotavator 1.3.4 Ridger 1.3.5 Spring tine harrow 1.3.6 Disc harrow 1.3.7 Power plough 1.4 Adjustment of tillage tools 1.5 Proper use of manuals 1.6 Methods of tertiary tillage 1.6.1 Ridging 1.6.2 Rolling 1.6.3 Sub soiling 1.7 Methods of maintaining secondary and tertiary tillage tools and equipment 1.8 Economics of tractor business 1.9 Safety and Operational Efficiency using AI 1.9.1 Operator Assistance Systems 1.9.2 Real-Time Monitoring and Alerts 1.9.3 Fleet Management Optimization	

Learning Outcome	Content	Suggested Assessment Methods
2. Operate planting equipment and machinery	2.1 Planting Equipment and Machinery 2.1.1 Row crop planter 2.1.2 Pneumatic planter 2.1.3 Potato planter 2.1.4 Seed drills 2.1.5 Manure Spreaders 2.1.6 Dibber 2.1.7 Precision planters 2.2 Calibration methods 2.2.1 Static method 2.2.2 Field method 2.3 Planting methods 2.3.1 Broadcasting 2.3.2 Drilling 2.3.3 Row planting 2.3.4 Hill dropping 2.3.5 Precision planting 2.4 Maintenance practices of planting machinery and equipment 2.5 Calibration of planting machinery and equipment	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
3. Operate crop protection equipment and machinery	3.1 Crop protection tools and equipment 3.1.1 Knapsack sprayer 3.1.2 Boom sprayer 3.1.3 Dusters 3.2 Selection of crop protection tools and equipment 3.3 Uses of crop protection tools and equipment	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	3.4 Parts of crop protection tools and equipment 3.5 Proper use of manuals 3.6 Sprayer Calibration methods 3.6.1 Static method 3.6.2 Field method 3.7 Storage of crop protection machinery and equipment	
4. Operate harvesting machinery and equipment	4.1 Harvesting machinery and equipment 4.1.1 Balers 4.1.2 Mowers 4.1.3 Hay conditioners 4.1.4 Forage harvesters 4.1.5 Combine harvesters 4.2 Calibration of harvesting methods 4.2.1 Static method 4.2.2 Field method 4.3 Adjustment of harvesting machinery and equipment 4.4 Proper use of manuals 4.5 Maintenance practices of harvesting machinery and equipment	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
5. Operate agro-processing machinery and equipment	5.1 Agro-processing equipment and machinery 5.2 Hand agro-processing machines 5.3 Filling and process machinery 5.4 Factors to be consider during selection of agro-processing machinery and equipment	• Practical • Project • Portfolio of evidence • Third party report • Written tests

Learning Outcome	Content	Suggested Assessment Methods
	5.5 Proper use of manuals 5.6 Classification agro-processing machines and equipment 5.7 Operation of agro-processing machinery and equipment 5.8 Parts of agro-processing machines and equipment 5.9 Methods of maintaining agro-processing machines and equipment	• Oral questioning

Suggested Methods of Delivery

- Demonstration
- Projects
- Group discussion
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
1.	Projector		1	1:25
2.	Scientific calculators		25	1:1
3.	Computer with internet		1	1:25
4.	equipment user manuals		1	1:25
5.	Machinery manuals		1	1:25
B	**Learning Facilities & infrastructure**			
1.	Classroom	40 M^2	1	1:25

C	**Consumable materials**			
1.	Stationery	Assorted	1 rim of printing papers 1 packet of pens 1packet of maker pens	1:25
D	**Tools and Equipment**			
1.	Land clearing tools and equipment		1	1:25
2.	Primary tillage tools and equipment		1	1:25
3.	Secondary tillage tools and equipment		1	1:25
4.	Tertiary tillage tools and equipment		1	1:25
5.	Crop protection tools and equipment		1	1:25
6.	Dairy machineries		1	1:25