REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR AGRICULTURAL ENGINEERING
KNQF LEVEL 5

(CYCLE 3)

PROGRAMME ISCED CODE: 0716 454 A

TVET CDACC
P.O. BOX 15745-00100 NAIROBI

FARM IRRIGATION AND DRAINAGE

UNIT CODE: 0716 451 14A

UNIT CODE: ENG/CU/AGR/CR/05/5/MA

UNIT DURATION: 180 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency**: Carry out irrigation and drainage**

Unit Description

This unit specifies the competencies required by agricultural engineering craftsperson to perform irrigation and drainage practices. It involves designing irrigation and drainage, installing irrigation and drainage systems and maintaining irrigation and drainage systems.

Summary of Learning Outcomes

S/No	Learning Outcomes	Duration (Hours)
1.	Design farm irrigation and drainage systems	60
2.	Install farm irrigation and drainage systems	100
3.	Maintain farm irrigation and drainage systems	20
TOTAL		**180**

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1 Design farm irrigation and drainage systems	1.1 Design considerations for irrigation and drainage system e.g. 1.1.1 Purpose 1.1.2 Type of soil 1.1.3 Type of irrigation 1.1.4 Amount of water 1.1.5 Crop water requirements 1.2 Crop water requirement computations 1.2.1 CROPWAT	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	1.2.2 CLIMWAT 1.2.3 ETo Calculator 1.3 Procedure of designing farm irrigation and drainage systems 1.4 Drawing and approvals of designs 1.4.1 Civil 3D 1.5 Irrigation and drainage scheduling methods 1.6 Costs involved in designing irrigation and drainage systems	
2 Install irrigation and drainage systems	2.1 Relevant tools and equipment required to install an irrigation and drainage system 2.2 Types of irrigation and drainage systems e.g. 2.2.1 Surface 2.2.2 Subsurface 2.2.3 Herringbone 2.2.4 Gridiron 2.3 Installation materials and availability 2.4 Installation procedures of irrigation and drainage system	• Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
3 Maintain irrigation and drainage systems	3.1 Maintenance activities 3.1.1 Corrective maintenance 3.1.2 Preventive maintenance 3.1.3 Predictive maintenance 3.1.4 Conditional maintenance 3.2 Importance of maintenance activities 3.3 Smart Irrigation and Water Management using AI systems 3.3.1 Automated Irrigation Systems	• Practical • Project • Portfolio of evidence • Third party report • Written tests

Learning Outcome	Content	Suggested Assessment Methods
	3.3.2 Water Quality Monitoring 3.3.3 Leak Detection and Maintenance Alerts	• Oral questioning

Suggested Methods of Delivery

1. Demonstration
2. Projects
3. Group discussion
4. Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	**Learning Materials**			
	Projector		1	1:25
	Scientific calculators		25	1:25
	Computer with internet		1	1:25
B	**Learning Facilities & infrastructure**			
	Classroom	40 m^2	1	1:25
C	**Consumable materials**			
	Stationery	Assorted	1 rim of printing papers 1 packet of pens 1packet of maker pens	1:25
D	**Tools and Equipment**			
	Pipes & Fittings			

	Drip kits		5	1:5
	Sprinklers kit		5	1:5
	Pump		1	1:25
	0.5-acre farm			
	Toolbox		1	1:25
	Testing kit		1	1:25