



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 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 Technologist level 6 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	<p>1.1 Design considerations for irrigation and drainage system e.g.</p> <p>1.1.1 Purpose</p> <p>1.1.2 Type of soil</p> <p>1.1.3 Type of irrigation</p> <p>1.1.4 Amount of water</p> <p>1.1.5 Crop water requirements</p> <p>1.2 Crop water requirement computations</p> <p>1.2.1 CROPWAT</p> <p>1.2.2 CLIMWAT</p>	<ul style="list-style-type: none">• Practical• Project• Portfolio of evidence• Third party report• Written tests• Oral questioning

Learning Outcome	Content	Suggested Assessment Methods
	<p>1.2.3 ETo Calculator</p> <p>1.3 Procedure of designing farm irrigation and drainage systems</p> <p>1.4 Drawing and approvals of designs</p> <p>1.4.1 Civil 3D</p> <p>1.5 Irrigation and drainage scheduling methods</p> <p>1.6 Costs involved in designing irrigation and drainage systems</p>	
2 Install irrigation and drainage systems	<p>2.1 Relevant tools and equipment required to install an irrigation and drainage system</p> <p>2.2 Types of irrigation and drainage systems e.g.</p> <p>2.2.1 Surface</p> <p>2.2.2 Subsurface</p> <p>2.2.3 Herringbone</p> <p>2.2.4 Gridiron</p> <p>2.3 Installation materials and availability</p> <p>2.4 Installation procedures of irrigation and drainage system</p>	<ul style="list-style-type: none"> • Practical • Project • Portfolio of evidence • Third party report • Written tests • Oral questioning
3 Maintain irrigation and drainage systems	<p>3.1 Maintenance activities</p> <p>3.1.1 Corrective maintenance</p> <p>3.1.2 Preventive maintenance</p> <p>3.1.3 Predictive maintenance</p> <p>3.1.4 Conditional maintenance</p> <p>3.2 Importance of maintenance activities</p> <p>3.3 Smart Irrigation and Water Management using AI systems</p> <p>3.3.1 Automated Irrigation Systems</p>	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> 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	1:25

			1 packet of maker pens	
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