

SOIL SCIENCE PRINCIPLES

UNIT CODE: 0811 551 12A

TVET CDACC UNIT CODE: AGR/CU/AP/CC/02/6/MA

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply soil science principles

DURATION OF UNIT: 120 Hours

UNIT DESCRIPTION

This unit specifies the competencies required to apply soil science principles. It includes competencies for performing soil sampling, analysis and improving soil fertility.

Summary of Learning Outcomes

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

S/No	Learning Outcomes	Duration (Hours)
1.	Perform soil sampling	40
2.	Perform soil analysis	40
3.	Improve soil fertility	40
Total		120

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Perform soil sampling	<p>1.1 Personal protective equipment</p> <ul style="list-style-type: none">• Gloves• Gumboots• Safety goggles• Overalls• Dust coats• Earmuffs• Face masks <p>1.2 Soil sampling and soil testing tools and</p>	<ul style="list-style-type: none">● Written assessment● Practical● Projects● Third party report● Portfolio of evidence● Oral questions

	<p>equipment</p> <ul style="list-style-type: none"> • Hoes • Machetes • Secateurs • Shovels • Soil augur • Panga • Hammer • Saw • Bucket • Shears • Dibbler • Pegs <p>1.3 Soil testing equipment</p> <ul style="list-style-type: none"> • Digestion block • Kjeldahl apparatus • UV-VIS Spectrophotometer • Atomic absorption spectrophotometer (AAS) • Flame photometer • pH meter • EC meter • TDS meter • Fume chamber • Measuring cylinders • Assorted glassware for routine laboratory procedures • Mechanical stirrer <p>1.4 Soil sampling procedures</p> <ul style="list-style-type: none"> • Field layout 	
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	<ul style="list-style-type: none"> • Sample collection • Compositing • Packaging • Processing • Storage <p>1.5 Soil sample preparation</p>	
2. Perform soil analysis	<p>2.1. Personal protective equipment</p> <p>2.2. Soil analysis equipment and materials</p> <p>2.3. Processing of soil samples</p> <p>2.4. Soil properties</p> <ul style="list-style-type: none"> • Soil texture • Soil aggregation • Soil consistency • Soil colour • Soil moisture • Soil air • Soil bulk density • Water holding capacity • Soil pH • Soil EC • Cation exchange capacity • Percent base saturation • Salt index • Microbial activity • CN ratio <p>2.5. Preparation of soil analysis report</p>	<ul style="list-style-type: none"> ● Written assessment ● Practical ● Projects ● Third party report ● Portfolio of evidence ● Oral questions
3. Improve soil fertility	<p>3.1. Personal protective equipment</p> <p>3.2. Soil fertility</p> <ul style="list-style-type: none"> ● Characteristics of a fertile soil ● Ways in which soil losses fertility 	<ul style="list-style-type: none"> ● Written assessment ● Practical ● Projects

	<p>3.3. Fertilizers</p> <ul style="list-style-type: none"> • Organic • Inorganic <p>3.4. Soil amendments</p> <ul style="list-style-type: none"> • Fertilizers • Agricultural lime • Gypsum <p>3.5. Soil conservation measures</p> <ul style="list-style-type: none"> • Cover cropping • Mulching • Strip cropping • Building of terraces • Minimum tillage • Contour ploughing 	<ul style="list-style-type: none"> ● Third party report ● Portfolio of evidence ● Oral questions
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Suggested methods of delivery

- Project
- Demonstration
- Practicals
- Discussions
- Direct instruction

Recommended resources 25 students

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
A	Learning Materials			
1	Charts	Flip Charts Rules and Regulations	5	1:5

2.	Markers	whiteboard markers and permanent markers Felt pens	5	1:5
3	Computer laboratory	Well equipped.	25	1:5
B	Learning Facilities & Infrastructure			
4.	Lecture classroom	(9* 8 sq. metres)	1	1:25
5.	Internet Connection	WI-FI, Dial-Up, Cable, Fixed-wireless,	1	1:25
C	Consumable Materials			
6.	Flashcards	Alphabet, Numbers, Math	25	1:1
7.	Stationery	Printing Papers, and Exercise Books Sizes A4, A3, A2. Masking tapes Notebooks Text books		1:5
9.				
D	Tools And Equipment			
10.	Tools	Shovels Jembes Mattocks Pangas Water taps Soil sampling packaging bags. Ropes/ strings Measuring tapes. Pegs/ranging rods	5 5 5 5 5 5 5 5 5 5	1:5

		Soil auger	5	
12.	Projector	LED.LCD, Laser	5	1:5
13.	PH kits		5	1:25

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