

## 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
<b>Total</b>		<b>120</b>

### Learning Outcomes, Content and Suggested Assessment Methods

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

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

	<p>3.3. Fertilizers</p> <ul style="list-style-type: none"> <li>• Organic</li> <li>• Inorganic</li> </ul> <p>3.4. Soil amendments</p> <ul style="list-style-type: none"> <li>• Fertilizers</li> <li>• Agricultural lime</li> <li>• Gypsum</li> </ul> <p>3.5. Soil conservation measures</p> <ul style="list-style-type: none"> <li>• Cover cropping</li> <li>• Mulching</li> <li>• Strip cropping</li> <li>• Building of terraces</li> <li>• Minimum tillage</li> <li>• Contour ploughing</li> </ul>	<ul style="list-style-type: none"> <li>• Third party report</li> <li>• Portfolio of evidence</li> <li>• Oral questions</li> </ul>
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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)
<b>A</b>	<b>Learning Materials</b>			
1	Charts	Flip Charts Rules and Regulations	5	1:5



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