

## SOIL SCIENCE

**UNIT CODE: 0811 441 05A**

**TVET CDACC UNIT CODE: HE/CU/AHP/CC/25/5/MA**

### **Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Apply Knowledge of soil science

**UNIT DURATION: 30 Hours**

### **Unit Description**

This unit specifies the competencies required by an animal health and production technician to demonstrate knowledge of soil science. It involves applying knowledge of principles of soil science, apply knowledge of soil organisms and organic matter; and applying knowledge of soil fertility in fodder production.

### **Summary of Learning Outcomes**

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

| S/No         | Learning Outcomes                                      | Duration (Hours) |
|--------------|--------------------------------------------------------|------------------|
| 1.           | Apply principles of soil science                       | 10               |
| 2.           | Apply knowledge of soil organisms and organic matter   | 10               |
| 3.           | Apply knowledge of soil fertility in fodder production | 10               |
| <b>Total</b> |                                                        | <b>30</b>        |

### **Learning Outcomes, Content and Suggested Assessment Methods**

| Learning Outcomes                   | Content                                                                                                                                                    | Suggested Assessment Methods                                                                                                                              |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Apply principles of soil science | 1.1. Introduction to soil science<br>1.2. Soil formation - broad categories of soil forming rocks,<br>1.3. Soil physical properties<br>1.3.1. Soil texture | <ul style="list-style-type: none"><li>● Practical</li><li>● Project</li><li>● Written tests</li><li>● Third party report</li><li>● Portfolio of</li></ul> |

|                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                    |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                         | <p>1.3.2. Soil aggregation</p> <p>1.3.3. Soil consistency</p> <p>1.3.4. Soil colour</p> <p>1.3.5. Soil moisture</p> <p>1.3.6. Soil air</p> <p>1.3.7. Soil bulk density</p> <p>1.3.8. Water holding capacity</p> <p>1.4. Soil chemical properties</p> <p>1.4.1. Soil pH</p> <p>1.4.2. Soil EC</p> <p>1.4.3. Cation exchange capacity</p> <p>1.4.4. Percent base saturation</p> <p>1.4.5. Salt index</p> <p>1.5. Soil biological properties</p> <p>1.5.1. Microbial activity</p> <p>1.5.2. CN ratio</p> <p>1.6. Factors influencing soil formation</p> <p>1.6.1. Parent material</p> <p>1.6.2. Climate</p> <p>1.6.3. Topography</p> <p>1.6.4. Biota</p> <p>1.6.5. Time</p> <p>1.7. Soil sampling methods</p> <p>1.7.1. Grid sampling</p> <p>1.7.2. Zone sampling</p> <p>1.7.3. Conventional sampling</p> | <p>evidence</p> <ul style="list-style-type: none"> <li>● Oral questions</li> </ul>                                                                                                                 |
| 2. Apply knowledge of soil organisms and organic matter | <p>2.1. Introduction to Soil organisms</p> <p>2.2. Effect of soil organisms</p> <p>2.3. Organic matter.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>● Practical</li> <li>● Project</li> <li>● Written tests</li> <li>● Third party report</li> <li>● Portfolio of evidence</li> <li>● Oral questions</li> </ul> |

|                                                           |                                                                                      |                                                                                                                                                                                                    |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3. Apply knowledge of soil fertility in fodder production | 3.1. Soil fertility in fodder production<br>3.2. Organic farming<br>3.3. Fertilizers | <ul style="list-style-type: none"> <li>● Practical</li> <li>● Project</li> <li>● Written tests</li> <li>● Third party report</li> <li>● Portfolio of evidence</li> <li>● Oral questions</li> </ul> |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Suggested Methods of delivery

- Practical
- Projects
- Demonstrations
- Group discussion
- Direct instructions

### Training resources for 25 trainees

| S/No.    | Category/Item                                   | Description/Specification                       | Quantity | Recommended Ratio (Item: Trainee) |
|----------|-------------------------------------------------|-------------------------------------------------|----------|-----------------------------------|
| <b>A</b> | <b>Learning materials</b>                       |                                                 |          |                                   |
| 1        | Projector                                       | EPSOM                                           | 1        | 1:25                              |
| 2        | Whiteboard/smartboard                           | 2.5 By 1.5.M                                    | 1        | 1:25                              |
| 3        | Desktop/computer                                |                                                 | 1        | 1:25                              |
| <b>B</b> | <b>Learning Facilities &amp; Infrastructure</b> |                                                 |          |                                   |
| 1        | Lecture/Theory room                             | Well-lit with 25 seats                          | 1        | 1:25                              |
| 2        | Laboratory                                      |                                                 | 1        | 1:25                              |
| 3        | Animal farm                                     |                                                 | 1        | 1:25                              |
| 4        | Library                                         | Equipped with soil science books and E- section | 1        |                                   |
| <b>C</b> | <b>Consumable Materials</b>                     |                                                 |          |                                   |
| <b>D</b> | <b>Tools and Equipment</b>                      |                                                 |          |                                   |
| 1        | Soil Auger                                      |                                                 | 5        | 1:5                               |
| 2        | Khaki bags                                      |                                                 | 25       | 1:1                               |
| 3        | Buckets                                         |                                                 | 5        | 1:5                               |
| 4        | Hoes                                            |                                                 | 5        | 1:5                               |
| 5        | Machetes                                        |                                                 | 5        | 1:5                               |

|    |                                           |  |   |     |
|----|-------------------------------------------|--|---|-----|
| 6  | Shovels                                   |  | 5 | 1:5 |
| 7  | Digestion block                           |  | 2 |     |
| 8  | UV-VIS Spectrophotometer                  |  | 2 |     |
| 9  | Atomic absorption spectrophotometer (AAS) |  | 2 |     |
| 10 | Flame photometer                          |  | 2 |     |