

## FARM TRACTOR OPERATION

**ISCED UNIT CODE:** 0716 351 01A

**TVET CDACC UNIT CODE:** ENG/CU/AME/CR/01/4/MA

### Relationship to Occupational Standards

This unit addresses the unit of Learning: Operate farm tractor

**Duration of the unit:** 250 hours

### Unit description:

This unit specifies the competencies required by a Farm Machinery and Equipment Operator Level 4 to operate farm tractor. It involves determining force, work, energy and power, performing bench work, analysing physical properties of engineering materials, carrying out mechanical machining operations, applying geometry and measurements, inspecting farm tractor systems, driving farm tractor, servicing farm tractor systems, maintaining and repairing farm tractor systems.

### Summary of Learning Outcomes:

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

S/No	Learning Outcomes	Duration (Hours)
1.	Determine force, work, energy and power.	20
2.	Perform bench work	40
3.	Analyse physical properties of engineering materials	30
4	Carry out mechanical machining operations.	50
5	Apply geometry and measurements	10
6	Inspect farm tractor systems	10
7	Drive farm tractor	20
8	Operation Farm tractor system	20
9	Service farm tractor systems	20
10	Maintain and repair farm tractor systems	30
<b>Total</b>		<b>250</b>

### Learning Outcomes, Content and Suggested Assessment Methods

Learning outcome	Content	Methods of Assessment
1.Determine force, work, energy and power	1.1.1.1 Personal protective equipment 1.2.Define force, work, energy and power 1.3.Describe forms of energy; 1.3.1. Renewable solar, wind water, geothermal, biogas etc. 1.3.2. Non-renewable 1.4.Convert energy from one form to another 1.5.Solve simple calculations on force, work, energy and power	<ul style="list-style-type: none"> <li>• Written tests</li> <li>• Oral questioning</li> <li>• Assignments</li> <li>• Supervised exercises.</li> <li>• Practical tests</li> </ul>
2. Perform bench work	2.1.Wear personal protective Equipment appropriately. 2.2.Assemble bench work tools as per work procedure. 2.3.Perform benchwork operations as per work procedures. 2.4.Maintain benchwork tools.	<ul style="list-style-type: none"> <li>• Written tests</li> <li>• Oral questioning</li> <li>• Assignments</li> <li>• Supervised exercises</li> </ul>
3. Analyse physical properties of engineering materials	3.1.Wear personal protective Equipment appropriately 3.2.Identify engineering materials as per physical properties. 3.3.Test Engineering materials as per work requirements.	<ul style="list-style-type: none"> <li>• Written tests</li> <li>• Oral questioning</li> <li>• Assignments</li> <li>• Supervised exercises</li> </ul>
4. Carry out mechanical machining operations	4.1.Wear personal protective Equipment appropriately 4.2.Identify mechanical machines according to the work carried out 4.3.Perform mechanical machining operations as per work requirements. 4.4.Identify ways of recycling and reusing waste materials in machining operations. 4.5.Identify use of ecofriendly materials	<ul style="list-style-type: none"> <li>• Written tests</li> <li>• Oral questioning</li> <li>• Assignments</li> <li>• Supervised exercises</li> </ul>

	in the workshop. 4.6.Maintain mechanical machines as per manufacturers specifications and manuals	
5.Apply geometry and measurements	5.1 Obtain perimeter and areas of regular figures using geometric rules. 5.2 Obtain Volumes and surface area of Solids using geometric rules 5.3 Solve engineering problems using Pythagoras theorem as per work requirements	<ul style="list-style-type: none"> <li>• Written tests</li> <li>• Oral questioning</li> <li>• Assignments</li> <li>• Supervised exercises.</li> </ul>
6.Inspect farm tractor systems	6.1 The observance of Kenyan regulations concerned with health, safety and the environment; 6.2 The use of personal protective equipment and clothing (PPE) used throughout work activities; 6.3 Potential safety hazards in the work environment 6.4 Inspection of farm tractor systems as per the operator's manual. Prepare farm tractor inspection report.	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Practical exercises</li> <li>• Oral</li> <li>• Written</li> <li>• Third party report</li> </ul>
7.Drive farm tractor	7.1 Wear person protective equipment and clothing (PPE) 7.2 Farm tractor starting. 7.3 Carry out safe driving of tractor	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Practical exercises</li> <li>• Oral</li> <li>• Written</li> <li>• Third party report</li> </ul>
8. Operate farm tractor system	8.1 Wear personal protective equipment (PPE) appropriately 8.2 Identify selected tractor systems 8.2.1 Cooling system 8.2.2 Electrical system 8.2.3 Transmission system 8.2.4 Hitches 8.2.5 Power Take off (PTO) 8.2.6 Hydraulic system	<ul style="list-style-type: none"> <li>• Observation</li> <li>• Practical exercises</li> <li>• Oral</li> <li>• Written</li> <li>• Third party report</li> </ul>

	<p>8.2.7 Lubrication system</p> <p>8.2.8 Fuel system</p> <p>8.3 Carry out farm tractor system and equipment inspection.</p> <p>8.4 Mount /attach farm tractor equipment</p> <p>8.5 Perform operation of tractor systems</p> <ul style="list-style-type: none"> <li>Identify Electric powered tractors.</li> </ul>	
9. Service farm tractor systems	<p>9.1 Wear personal protective equipment (PPE) appropriately.</p> <p>9.2 Prepare service schedule</p> <p>9.3 Carry out pre-start checks of the farm tractor</p> <p>9.4 Utilize Automated farm tractor servicing i.e. Use of Robots</p> <p>9.5 Carry out routine scheduled services.</p> <p>9.6 Manage Farm tractor servicing waste by the three 3R principle (Reduce, Reuse, Recycle)</p> <p>9.7 Prepare farm tractor system service report.</p>	<ul style="list-style-type: none"> <li>Observation</li> <li>Practical exercises</li> <li>Oral</li> <li>Written</li> <li>Third party report</li> </ul>
10. Maintain and repair farm tractor systems	<p>10.1 Wear personal protective equipment (PPE) appropriately.</p> <p>10.2 Assemble Farm Tractor system maintenance and repair tools and equipment.</p> <p>10.3 Perform basic diagnostics on tractor systems</p> <p>10.3.1 Cooling system</p> <p>10.3.2 Electrical system</p> <p>10.3.3 Transmission system</p> <p>10.3.4 Hydraulic system</p> <p>10.3.5 Power take-off (PTO)</p> <p>10.3.6 Lubrication system</p> <p>10.3.7 Fuel system</p> <p>10.3.8 Steering system</p> <p>10.3.9 Hitches</p> <p>10.4 Identify common malfunctions of selected tractor systems</p> <p>Interpret results of the diagnostic tests of selected tractor systems</p>	<ul style="list-style-type: none"> <li>Observation</li> <li>Practical exercises</li> <li>Oral</li> <li>Written</li> <li>Third party report</li> </ul>

### **Suggested Methods of Instruction**

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- Visiting lecturer/trainer from the Agricultural Machinery service and repair sector;
- Industrial visits.

### **Recommended Resources for 25 Trainees**

- A fully equipped agricultural machinery and equipment maintenance workshop;
- Fully operational tractor
- Internet access to manufacturers' technical information;
- Personal protective equipment (PPE) and suitable coverings to protect vehicles;
- Facilities for the disposal of waste oil and used parts;
- Customer database and systems for recording maintenance records.
- Lubricants
- Fluids
- Replacement parts
- Cleaning materials
- Scientific Calculators

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### **Relationship to Occupational Standards**