

## ELECTRICAL PRINCIPLES I

**UNIT CODE:** 0713441 12A

**TVET CDACC UNIT CODE:** ENG/CU/MDE/CC/06/5/MA

**UNIT DURATION:** 80 HOURS

### Relationship to Occupational Standards

This unit addresses the Unit of Competency: Apply electrical principles I.

### UNIT DESCRIPTION

This unit describes competences required to apply electrical principles in their work. It involves applying electrical quantities, using cells and batteries and applying concepts of dc circuits.

### Summary of Learning Outcomes

	<b>Learning Outcome</b>	<b>Duration in hours.</b>
1.	To applying Electrical quantities	20
2.	To use cells and batteries	30
3.	To apply DC circuit	30
	<b>TOTAL</b>	<b>80</b>

### Learning Outcomes, Content and Suggested Assessment Methods

<b>Learning Outcome</b>	<b>Content</b>	<b>Suggested Assessment Methods</b>
1. Apply Electrical quantities	1.1 The meaning of SI unit 1.2 SI unit of various types of Electrical parameters 1.3 Ohm's law 1.4 Calculations involving various Electrical parameters e.g. Power, Current, Voltage, Resistance 1.5 Instruments used in measuring	<ul style="list-style-type: none"><li>• Practical Assessment</li><li>• Project</li><li>• Third Party Report</li><li>• Portfolio of Evidence</li><li>• Written Assessment</li><li>• Oral Questioning</li></ul>

	various types of Electrical parameters	
2. Use cells and batteries	2.1 Sources of electricity 2.2 electrolysis and its applications 2.3 Simple cells 2.4 Primary and secondary cells 2.5 Types of cells and batteries <ul style="list-style-type: none"> <li>5.3.1. Dry cells</li> <li>5.3.2. Leclanché</li> <li>5.3.3. Mercury</li> <li>5.3.4. Lead-acid</li> <li>5.3.5. Alkaline</li> <li>5.3.6. Lithium</li> </ul> 2.6 E.m.f and internal resistance of cells 2.7 Maintenance of batteries 2.8 Applications of batteries	<ul style="list-style-type: none"> <li>• Practical Assessment</li> <li>• Project</li> <li>• Third Party Report</li> <li>• Portfolio of Evidence</li> <li>• Written Assessment</li> <li>• Oral Questioning</li> </ul>
3. Apply DC circuit	3.1 Resistance and resistivity 3.2 Parallel and series circuits 3.3 Basic electrical laws <ul style="list-style-type: none"> <li>3.3.1. Ohms law</li> </ul> 3.4 DC theorems <ul style="list-style-type: none"> <li>3.4.1. Kirchhoff's theorem</li> <li>3.4.2. Superposition theorem</li> <li>3.4.3. Thevenin's theorem</li> <li>3.4.4. Norton theorem</li> <li>3.4.5. Maxwell theorem</li> </ul>	<ul style="list-style-type: none"> <li>• Practical Assessment</li> <li>• Project</li> <li>• Third Party Report</li> <li>• Portfolio of Evidence</li> <li>• Written Assessment</li> <li>• Oral Questioning</li> </ul>

### Suggested Methods of Instruction

- Practical
- Projects

- Demonstrations
- Group Discussions
- Field trips
- On-job-training

**Recommended Resources for 25 trainees**

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Item: Trainee)
<b>A</b>	<b>Learning Materials</b>			
1.	Textbooks	J. Bird Electrical and Electronic Principles  V.K. Mehta & R. Mehta Basic Electrical Engineering	5 pcs	1:5
2.	Installation manuals	Electronic components datasheets	5 pcs	1:5
3.	Charts	Circuit diagrams  Colour codes	1 pcs for each	1:25
4.	Scientific Calculators		25	1:1
5.	Power point presentations	For trainer's use	1	1:25
<b>B</b>	<b>Learning Facilities &amp; infrastructure</b>			
6.	Lecture/theory room	60m <sup>2</sup>	1	1:25

7.	Workshop	150m <sup>2</sup>	1	1:25
<b>C</b>	<b>Consumable materials</b>			
8.	Connector wires	Jumper wires,	5 pkts	1:5
9.	Insulation tapes		25 pcs	1:1
10.	Circuit boards	Bread board, copper strip boards	25 pcs	1:1
11.	Assorted electronic components	Resistors, diodes, capacitors, transistors, ICs, Transformers, Inductors, Batteries	25 pcs	1:1
12.	Soldering wires		5 rolls	1:5
<b>D</b>	<b>Tools and Equipment</b>			
13.	Striping knives		25 pcs	1:1
14.	Side cutters		25 pcs	1:1
15.	Pliers		25 pcs	1:1
16.	Assorted Screw driver		25 pcs	1:1
17.	Crimping tools		5 pcs	1:5
18.	PPEs		25 pcs	1:1

19.	Multimeters		5 pcs	1:5
20.	Oscilloscope		5 pcs	1:5
21.	Function generator		5 pcs	1:5
22.	Spectrum analyser		5 pcs	1:5
23.	Variable power supply		5 pcs	1:5
24.	Solder guns		25 pcs	1:1
25.	Hot air gun		5 pcs	1:5
26.	Work stations		25	1:1