#### APPLY ELECTRICAL AND ELECTRONICS PRINCIPLES

UNIT CODE: 0713 441 09A

TVET CDACC UNIT CODE: ENG/OS/AUT/CC/05/5/MA

#### **UNIT DESCRIPTION**

DI DMENT

This unit describes the competences required in order to apply electrical and electronics principles. It involves applying basic concepts of electrical quantities, cells and batteries, magnetism and electromagnetism, basic electrical machines and electronics principles.

DEDECORMANCE CRITERIA

#### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT PERFORMANCE CRITERIA		
These describe the key These are assessable statements which specify the red	These are assessable statements which specify the required level	
outcomes which make of performance for each of the elements.		
up workplace function. Bold and italicized terms are elaborated in the Range.		
1. Apply basic 1.1 <b>SI unit</b> s in Electrical are identified as per task	ζ	
concepts of requirement		
electrical quantities   1.2 <i>Quantities</i> of Charge, force, work and power	are applied	
as per task requirement		
1.3 Calculations involving Ohm's law are perform	ned as per	
task requirement		
1.4 Measuring instruments for electrical quantities	es are	
applied as per task requirement	applied as per task requirement	
2. Apply DC and AC 2.1 Calculations of DC parallel and series circuits	s are	
circuits performed as per task requirement		
2.2 Calculations involving series resistor, inductor	or and	
capacitors in AC circuits are performed as per	r task	
requirement		
2.3 Calculations involving parallel resistor, induc	etor and	
capacitors in AC circuits are performed as per	r task	
requirement		
3. Apply the concept 3.1 Various sources of electricity are used as per	task	
of cells and requirement		
batteries 3.2 Electrolysis is applied as per task requirement	t	
3.3 E.M.F and internal resistance of cells is determined to the state of the state	mined as per	
task requirement		

These describe the key outcomes which make up workplace function.    3.4   Primary and secondary cells are applied as per task requirement	ELEMENT	PERF	ORMANCE CRITERIA		
up workplace function.    3.4   Primary and secondary cells are applied as per task requirement	These describe the key	These a	are assessable statements which specify the required level		
3.4 Primary and secondary cells are applied as per task requirement 3.5 Cells and batteries are applied as per task requirement 3.6 Maintenance of batteries is carried out as per task requirement 4.1 Magnetic and nonmagnetic materials are used as per task requirement 4.2 Magnetic field patterns are utilized as per task requirement 4.3 Force on current carrying conductor is applied as per task requirement 4.4 Magnetic circuit quantities are applied as per task requirement 4.5 Magnetism curve and hysteresis loop are applied as per task requirement 4.6 Electromagnetic induction principle is applied as per task requirement 5. Apply basic electrical machines 5.1 Electrical machines are applied as per task requirement 5.3 AC machines are applied as per task requirement 5.4 Capacitors are applied as per task requirement 6.5 Apply electronics 6.1 Capacitors are applied as per task requirement 6.2 Resistors are applied as per task requirement 6.3 Inductors are applied as per task requirement 6.4 Inductors are applied as per task requirement 6.5 Application and testing of electronics components is	outcomes which make	of perfe	of performance for each of the elements.		
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		6.1	Diodes are applied as per task requirement		
		6.2	Application and testing of electronics components is		
performed as per task requirement			performed as per task requirement		

# **RANGE**

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

Variable	Rang	ge		
	May	May include but not limited to:		
1. SI unit includes but not limited	1.1	Power – Watts (W)		
to:	1.2	Current – Amperes (A)		
	1.3	$\text{Resistance} - \text{Ohms}(\Omega)$		
	1.4	Voltage – Volts (V)		
2. Quantities includes but not	2.1	Charge		
limited to:	2.2	Force		
	2.3	Work		
	2.4	Power		
3. Electrical machines include but	3.1	DC motors		
not limited to:	3.2	Transformers		
	3.3	Generators DC		

# REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

# **Required Skills**

The individual needs to demonstrate the following skills:

- Use of electrical instruments
- Power factor correction
- Logical thinking
- Problem solving
- Drawing graphs
- Using different measuring tools

# Required knowledge

The individual needs to demonstrate knowledge of:

- Electrical power calculations
- Electrical formulas
- Power triangle
- SI units of various electrical parameters
- Types of electrical machines for various uses

- Types and purpose of measuring instruments
- Units of measurement and abbreviations

# **EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge and range.

1	Critical aspects of	Assessment requires evidence that the candidate:	
	competency	1.1 Applied quantities of Charge, force, work and power as	
		per task requirement	
		1.2	Performed calculations involving Ohm's law as per task
			requirement
		1.3	Performed calculations of DC parallel and series circuits
		as	per task requirement
		1.4	Determined E.M.F and internal resistance of cells as per
			task requirement
		1.5	Applied force on current carrying conductor as per task
			requirement
		1.6	Applied electrical machines as per task requirement
		1.7	Applied capacitors as per task requirement
		1.8	Applied resistors as per task requirement
		1.9	Applied inductors as per task requirement
2.	Resource	The following resources should be provided:	
	implications	2.1	Appropriately simulated environment where assessment
			can take place
		2.2	Access to relevant work environment
		2.3	Resources relevant to the proposed activities or tasks
3.	Methods of	Competency in this unit may be assessed through:	
	assessment	3.1	Portfolio of evidence
		3.2	Practical test
		3.3	Third party report
		3.4	Written tests
		3.5	Project work
		5.5	1 Toject Work

4.	Context of	Competency may be assessed in the workplace or simulated	
	assessment	workplace	
5.	Guidance	Holistic assessment with other units relevant to the industry sector	
	information for	and workplace job role is recommended.	
	assessment		

