

APPLY ELECTRICAL ENGINEERING PRINCIPLES

UNIT CODE: 0713 541 06A

TVET CDACC CODE: ENG/OS/AGR/CC/03/5/MA

UNIT DESCRIPTION

This unit describes the competencies required by an Agricultural Engineering Craftsperson to apply electrical engineering principles. Competencies include: applying basic electrical quantity concepts, applying D.C and AC circuit concepts in electrical installation, applying earthing principles in electrical installation, applying lightening protection measures and operating basic electrical machines

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <i>Bold and italicized terms are elaborated in the Range.</i>
1. Apply basic electrical quantity concepts	1.1 <i>SI units</i> are identified as per work requirements 1.2 <i>Quantities</i> are determined as per work requirements. 1.3 Computations involving current, resistance and voltage are carried out. 1.4 Electrical quantities measuring instruments are identified
2. Apply D.C and AC circuit concepts in electrical installation	2.1 Computations involving parallel and series circuits are performed as per work requirements 2.2 Computations involving network theorems are performed as per work requirements 2.3 Photovoltaic solar system is installed as per work procedure 2.4 AC to DC and DC to AC conversion is performed as per work requirements

3. Apply earthing principles in electrical installation	3.1 Earthing points on electrical installation are identified as per work requirements 3.2 Computation involved in determining the earthing type is performed as per work requirements 3.3 Test on an earthing system is performed in line with the IEE regulations
4. Apply lightening protection measures	4.1 Components of lightening protection system are identified as per work requirements 4.2 Test is carried out in lightening protection system as per work requirements 4.3 Application of lightening protection system is determined as per work requirements
5. Operate basic electrical machines	5.1 Operation of single phase and three phase AC and DC Motors are performed as per work requirements 5.2 Computations involving single and three phase AC and DC transformers are performed as per work requirements 5.3 Operations involving single and three phase generators are performed as per work requirements 5.4 AC and DC machines are operated as per work procedure

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	Range
	May include but are not limited to:
1. SI units may include but are not limited to:	• Watts (W) • Amperes (A) • Ohms(Ω) • Volts (V)

2. Quantities may include but are not limited to:	• Charge • Force • Work • Power
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REQUIRED SKILLS AND KNOWLEDGE

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

Required knowledge

The individual needs to demonstrate knowledge of:

- Newton's law
- Laws of conservation of energy
- Occupational health and safety
- Units of measurement, conversions and abbreviations

Required Skills

The individual needs to demonstrate the following skills:

- Logical thinking
- Problem solving
- Communication
- Analytical

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 Competency	Assessment requires evidence that the candidate: 1.1 Carried out computations involving current, resistance and voltage. 1.2 Performed computations involving parallel and series circuits as per work requirements 1.3 Performed computations involving network theorems as per work requirements 1.4 Installed photovoltaic solar system as per work procedure
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	1.5 Performed AC to DC and DC to AC conversion as per work requirements 1.6 Performed computation involved in determining the earthing type as per work requirements 1.7 Performed tests on an earthing system in line with the IEE regulations 1.8 Carried out test in lightening protection system as per work requirements 1.9 Performed operation of single phase and three phase AC and DC Motors as per work requirements 1.10 Performed computations involving single and three phase AC and DC transformers as per work requirements 1.11 Performed operations involving single and three phase generators as per work requirements 1.12 Operated AC and DC machines as per work procedure
2. Resource Implications	The following resources should be provided: 2.1 Appropriately simulated environment where assessment can take place 2.2 Access to relevant work environment 2.3 Resources relevant to the proposed activity or tasks
3. Methods of Assessment	Competency in this unit may be assessed through: 3.1 Practical 3.2 Project 3.3 Portfolio of evidence 3.4 Third party report 3.5 Written tests 3.6 Oral assessment
4. Context of Assessment	Competency may be assessed: 4.1 Workplace 4.2 Simulated work environment

5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.
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