

Domain

ELECTRONICSTitle: **Carry out basic electrical circuit analysis**

Level: 1

Credits: 9

Purpose

This unit standard specifies the competencies required to carry out basic electrical circuit analysis. It includes identifying electrical components and circuits, sketching electrical circuit diagrams, analysing electrical circuits and simulating electrical circuits. This unit standard is intended for those who work in electronics industry.

Special Notes

1. Entry information

Prerequisite

- *Unit E01 - Apply health and safety rules and regulations in electronics workplace*
- *Unit E02 - Plan and organise work in electronic work environment*

2. Assessment evidence may be collected from a real or a simulated workplace in which electronics operations are carried out.

3. To demonstrate competence, minimum evidence of the identification of electrical components and circuits, sketching of electrical circuit diagrams, analysis of electrical circuits and simulation of electrical circuits (at least 50 percent of all areas in each element) is required

4. Glossary of terms:

- 'specifications' refers to any, or all of the following: manufacturers' specifications and recommendations, workplace specific requirements
- IEC 60617- **International Electro-technical Commission** pertaining to Graphical Symbols for Diagrams.
- IEEE- Institute of Electrical and Electronics Engineers.
- SANS' refers to South Africa National Standards
- 'IEC' refers to International Electrotechnical Commission.
- 'ISO' refers to International Organisation for Standards

5. Circuits to be analysed are resistive series, resistive parallel and resistive series-parallel circuits, Alternating Current (AC) and Direct Current (DC) circuits.

6. Performance of all elements in this unit standard must comply with industry standards.

7. Regulations and legislation relevant to this unit standard include the following:

- Labour Act, No. 11, 2007.
- SANS 10142-1
- SANS 10142-2
- Occupational Health and Safety Regulations No. 18, 1997 and all subsequent amendments

Quality Assurance Requirements

This unit standard and others within this subfield may be awarded by institutions which meet the accreditation requirements set by the Namibia Qualifications Authority and the Namibia Training Authority and which comply with the national assessment and moderation requirements. Details of specific accreditation requirements and the national assessment arrangements are available from the Namibia Qualifications Authority and the Namibia Training Authority on www.nta.com.na.

Elements and Performance Criteria

Element 1: Identify electrical components and circuits

Range

Components used in basic electrical circuits include but not limited to resistors, capacitors, inductors, transformers, relays, switches, conductors, insulators, fuses, voltage and current sources.

Performance Criteria

- 1.1 Electrical components are identified and named in accordance with IEC 60617 standards.
- 1.2 Electrical components' values are determined as per requirements.
- 1.3 Operational characteristics of basic electrical components are interpreted from specification sheets and application notes.
- 1.4 Types of electrical circuits are determined from a schematic diagram and/or printed circuit board (PCB).

Element 2: Sketch electrical circuit diagrams

Range

Types of electrical circuits to be sketched are series, parallel and series-parallel.

Performance Criteria

- 2.1 Electrical components symbols used in circuit diagrams are used in accordance with the IEC/IEEE standards.
- 2.2 Electrical components in circuit diagrams are connected in accordance with the IEC/IEEE standards to represent a given physical circuit.
- 2.3 Electrical components in circuit diagrams are labelled with values in accordance with the IEC/IEEE standards.
- 2.4 Electrical circuit diagrams are captioned according to workplace standards.

Element 3: Analyse electrical circuits

Range

The calculations include application of electrical fundamental laws and theorems e.g. ohms law, Kirchhoff's law.

Performance Criteria

- 3.1 Measurements and/or calculations are performed to determine the functionality of electrical circuits using appropriate instruments.
- 3.2 Measurement and/or calculated results are recorded in SI units and interpreted.

Element 4: Simulate electrical circuits

Range

Measuring instruments includes but are not limited to virtual multi-meters, virtual oscilloscope etc.

Performance Criteria

- 4.1 Electrical circuits are captured in circuit simulation software.
- 4.2 Virtual instruments are used for measuring circuit parameters.
- 4.3 Simulation results are recorded with appropriate SI units and interpreted.
- 4.4 Additional calculations are performed based on the recorded results when required.

Registration Data

Subfield:	Electrical Engineering
Date first registered:	
Date this version registered:	
Anticipated review:	
Body responsible for review:	Namibia Training Authority