

Domain**ELECTRONICS****Title: Analyse analogue electronics circuits II****Level: 2****Credits: 19****Purpose**

This unit standard specifies the competencies required to analyse analogue electronics circuits. It include demonstrating knowledge of diode circuits and their application, analysing Bipolar Junction Transistor (BJT) circuits, analysing basic Operational Amplifier circuits, analysing Oscillator circuits, analysing voltage regulation circuits, analysing analogue filter 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*
- *Unit E05 - Analyse analogue electronics circuits I*

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 identification of analogue electronics components, analysis of analogue circuits, sketching of analogue electronic schematic diagrams, simulation of analogue electronic circuits (at least 50 percent of all areas in each element) is required.

4. All circuit analyses methods include calculations, measurements and simulations.

5. Glossary of terms:

- IEC 60617- **International Electro-technical Commission** and this standard for electrical components symbols.
- IEEE- Institute of Electrical and Electronics Engineers.

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

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

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

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

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: Demonstrate knowledge of diode circuits and their application

Range

Diode circuits to be analysed include clippers, clampers, regulators, multipliers. Diode circuits' analysis methods include calculations, measurements and simulations.

Performance Criteria

- 1.1 Types of diodes devices are described in terms of their basic operation, characteristics and applications.
- 1.2 Uses of diodes in signal clipping circuits are explained with the aid of circuit sketches.
- 1.3 Clamping and Clipping circuits are analysed to determine performance parameters (output voltage wave form).
- 1.4 Diode based voltage regulator circuits are analysed to determine performance parameters (output voltage).
- 1.5 Diode based voltage multiplier circuits are analysed to determine performance parameters (output voltage).

Element 2: Analyse Bipolar Junction Transistor (BJT) circuits

Range

Transistor circuits to be identified include amplifiers and switching circuits. Transistor circuits configuration include common emitter (CE), common base (CB) and common collector (CC) for BJTs.

Performance Criteria

- 2.1 Different types of transistors circuits are identified based on their biasing methods.
- 2.2 Transistor configurations are identified from schematic diagrams.
- 2.3 BJT circuits are analysed to determine the DC operating point (Q-point).

Element 3: Analyse basic Operational Amplifier circuits and Oscillator circuits

Range

Operational Amplifier Circuits to be analysed include inverting, non-inverting, summing, voltage follower and differential amplifiers.

Oscillator circuits to be analysed are low, medium and high frequency oscillators including but not limited to R-C oscillators (Wein-bridge, phase-shift), L-C oscillators (Colpitts, Hartley), tuned oscillator and crystal controlled oscillator.

Performance Criteria

- 3.1 Types of Operational Amplifier and Oscillator circuits are identified.
- 3.2 Different Operational amplifier and Oscillator basic circuits are analysed to determine performance parameters (voltage gain).
- 3.3 Factors that affect oscillation are explained.

Element 4: Analyse voltage regulation circuits

Range

Voltage regulating circuits include linear series, linear shunt and monolithic regulators

Performance Criteria

- 4.1 Types of voltage regulators are identified.
- 4.2 Voltage regulator circuits are analysed to determine their performance parameters (voltage regulation and efficiency).

Element 5: Analyse analogue filter circuits

Range

Analogue filter circuits to be analysed include low-pass, high-pass, band-pass and band-stop filters.

Performance Criteria

- 5.1 Type of filter circuits are identified based on circuit component and configuration and/or applications.
- 5.2 Different filter circuits are analysed to determine their performance parameters based on filter type.
- 5.4 Filter transfer functions are sketched to represent frequency response (Gain and phase).

Registration Data

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

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