Unit ID: E012

Domain **ELECTRONICS**

Title: **Analyse analogue electronics circuits III**

Level: 3 **Credits: 16**

Purpose

This unit standard specifies the competencies required to analyse analogue electronics circuits. It includes Analysing Field Effect Transistor circuits, Analysing Operational Amplifier circuits and Analysing power amplifier circuits. This unit standard is intended for electronics technicians.

Special Notes

1. Entry information

   Pre requisite:
   - *Unit E01 - Apply health and safety rules and regulations in electronics workplace*
   - *Unit E02 - Plan and organise work in electronic work environment*
   - *Unit E010- Analyse analogue electronics circuits II*

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 analysis of field effect transistor circuits, analysis of operational amplifier circuits and analysis of power amplifier circuits (at least 50 percent of all areas in each element) is required

4. Glossary of terms:

   - IEC 60617- International Electro-technical Commission
   - IEE- Institute of Electrical and Electronics Engineers.
   - IGBT – Insulated Gate Bipolar Transistor

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

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.
   - IEC 60617 standards, standard for electrical components symbols.
   - 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: Analyse Field Effect Transistor circuits

Range
Circuits to be analysed include FET (JFET and MOSFET) amplifier and switching circuits.
FET configuration includes Common source (CS), common gate (CG), common drain (CD).

Performance Criteria

1.1 Different types of FET circuits are identified based on their biasing methods.

1.2 FET circuit configurations are identified from schematic diagrams.

1.3 FET biasing circuits are analysed to determine the DC operating point (Q-point).

1.4 FET amplifier circuits are analysed to determine performance parameters.

1.5 FET switching circuits are analysed to determine performance parameters.

1.6 IGBT circuits are analysed

Element 2: Analyse Operational Amplifier circuits

Range
Circuits to be analysed include single stage integrator, differentiator, multi-stage and instrumentation amplifiers

Performance Criteria

2.1 Apply data sheet information (bandwidth, slew rate, transient response, CMRR, output voltage swing, open loop gain etc.) to analyse Op Amp circuit performance.

2.2 Op Amp integrator, differentiator and precision circuits are analysed.

2.3 Op Amp analogue computer circuits are analysed.

2.4 Op Amp instrumentation amplifier circuits are analysed.

Element 3: Analyse power amplifier circuits

Range
Power amplifiers to be analysed include audio and radio frequency amplifiers

Performance Criteria

3.1 Power amplifier circuits are categorised according to frequency of operation and power handling capabilities.

3.2 Power efficiency, output power and power gain of Classes A, B, AB, C and D power amplifier are calculated.

3.6 Integrated circuits power amplifiers parameters are identified from data sheet.

3.7 The size and material of heat sinks are selected based on the power dissipation calculation.

Registration Data

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