

Domain**ELECTRONICS****Title:****Analyse advanced analogue electronics
circuits****Level: 3****Credits: 8****Purpose**

This unit standard is intended for those who analyse advanced analogue electronics circuits. People credited with this unit standard are able to analyse field effect transistor circuits, analyse operational amplifier circuits and analyse power amplifier circuits.

This unit standard is intended for people who carry out electronics tasks in an electronics industry.

Special Notes

1. Entry information

Pre requisite:

- *Unit 2011 - Apply health and safety rules and regulations in electronics workplace.*
- *Unit 2012 - Plan and organise work in electronics work environment.*
- *Unit 2020 - Apply knowledge of analogue electronics circuits analysis.*

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
- FET - Field-Effect 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.
- Regulations relating to the health & safety of employees at work under Schedule 1 (2) of the Labour Act No.11 of 2007
- 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), and 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 and open loop gain) 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.
- 3.3 Integrated circuits power amplifiers parameters are identified from data sheet.
- 3.4 The size and material of heat sinks are selected based on the power dissipation calculation.

Registration Data

Subfield:	Electrical Engineering
Date first registered:	29 November 2018
Date this version registered:	29 November 2018
Anticipated review:	2023
Body responsible for review:	Namibia Training Authority