Unit ID: ID 2209

Domain **AUTOMOTIVE MECHATRONICS**

Title: **Demonstrate knowledge of basic electrical and electronic circuits and components**

Level: 3 **Credits: 5**

Purpose

This unit standard is intended for those who demonstrate knowledge of basic electrical and electronic circuits and components. People credited with this unit standard are able to describe different electrical and electronic terms; describe basic electrical fundamentals; describe basic semiconductor fundamentals; read and interpret circuit diagrams and symbols; build basic electrical and electronic circuits; and describe Alternating Current and Direct Current systems.

This unit standard is intended for those who work in automotive mechatronics environment.

Special Notes

1. Entry information

   Prerequisite
   • *none*

2. This unit standard is to be assessed in the context of industrial safety operations and should be assessed in conjunction with other relevant technical unit standards selected from this domain.

3. Assessment evidence may be collected at a real workplace or simulated workplace in which safety operations are carried out.

4. Glossary of terms:
   - *'Specifications'* refers to any, or all the following: manufacturers' specifications and recommendations, workplace specific requirements, national and international standards and legislations
   - *'ISO'* refers to International Organization for Standards

5. Performance of all elements in this unit standard must comply with industry standards and workplace requirements.

6. Regulations and legislation relevant to this unit standard include the following:
   - Labour Act No. 11 of 2007
   - Regulations relating to the health and safety of employees at work under Schedule 1 (2) of the Labour Act No.11 of 2007
   - ISO 14001 (Environmental Management Standard) and all subsequent amendments to any of the above.

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 on www.namqa.org and the Namibia Training Authority on www.nta.com.na.

Elements and Performance Criteria

Element 1: Describe different electrical and electronic terms

Performance Criteria

1.1 Different electrical terms are defined and explained.

1.2 Different electronic terms are defined and explained.

Element 2: Describe basic electrical fundamentals

Performance Criteria

2.1. Different sources of power are identified and explained.

2.2. Direct Current (DC) and Alternating Current (AC) are explained.

2.3. Generation of DC and AC is explained.

2.4. Characteristics of electrical circuit are explained.

2.5. Calculations of current, voltage and resistance are conducted.

2.6. Ohm's law is applied when conducting calculations.

2.7. Different circuit configurations are explained (series, parallel and combination).

2.8. Power consumed in basic electrical circuits is calculated.

2.9. Actuators, sensors and input processing output, principles are explained.

2.10. Applications of different circuits are described.

Element 3: Describe basic semiconductor fundamentals

Performance Criteria

3.1 Different semiconductors are identified.

3.2 Operational characteristics of different semiconductors are explained.

3.3 Different semiconductor applications are explained.

Element 4: Read and interpret circuit diagrams and symbols

Performance Criteria

4.1 Different circuit diagrams are identified according to manufacturer's procedures.

4.2 Electrical and electronic symbols are interpreted according to manufacturers' procedures.

Element 5: Build basic electrical and electronic circuits

Performance Criteria

5.1. Basic electrical and electronic circuits are built and checked for safe operation.

5.2. Current, voltage, resistance and power are measured in the circuit.

5.3. Basic trouble shooting techniques on resistive loads is conducted.

5.4. Different parameters are measured from the electronic circuit.

5.5. Basic trouble shooting techniques on electronic circuits is demonstrated.

Element 6: Describe Alternating Current and Direct Current systems

Performance Criteria

6.1. Generation of single phase AC is explained.

6.2. Generation of DC system is explained.

6.3. Generation of three phase AC is explained.

6.4. Application of single phase and three phase is explained.

Registration Data

Subfield:	Automotive Engineering
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