

## APPLY ANALOGUE ELECTRONICS I

**UNIT CODE:** 0714441 10A

**TVET CDACC UNIT CODE: ENG/OS/MDE/CC/07/5/MA**

### UNIT DESCRIPTION

This unit describes the competencies required to apply analogue electronics. It involves applying semiconductor theory, semiconductor diodes, understanding of transistors, special semiconductor devices and performing rectification.

ELEMENTS	PERFORMANCE CRITERIA
These describe the key outcomes which make up workplace function.	These are assessable statements which specify the required level of performance for each of the elements. <i><b>Bold and italicized terms are elaborated in the Range.</b></i>
1. Understand semiconductor theory	1.1 Types of <b>materials</b> are identified in line with semiconductor theory 1.2 Semiconductor materials are identified as per electrical conductivity properties
2. Apply semiconductor diodes	2.1 Types of diodes are identified as per functionality 2.2 <b>Diodes</b> characteristics are determined as per properties 2.3 Forward and reverse bias characteristics are established as per properties of the semiconductor material
3. Apply transistors	3.1. <b>Transistors</b> are identified as per characteristics 3.2. NPN and PNP are determined as per operation 3.3. P and N channels are identified as per operation 3.4. <b>Biasing</b> and determination of gain of transistors is performed as per standard operating procedure

	3.5. Transistor configuration is performed as per application
4. Apply special semiconductor devices	4.1. Special semiconductor devices are identified as per operation 4.2. Special semiconductors are applied as per standard operating procedure 4.3 Types of special semiconductor devices are identified
5. Performed rectification	5.1 Types of rectifiers are identified as per functions 5.2 Classes of rectifiers are identified as per input voltage 5.3 Applications of rectifiers are established 5.4 Converters are identified as per functions 5.5 Applications of converters are established as per functions

## RANGE

This section provides work environments and conditions to which the performance criteria apply.

It allows for different work environments and situations that will affect performance.

Variable	Range
1. Materials may include but is not limited to:	<ul style="list-style-type: none"> <li>● Insulators</li> <li>● Conductors</li> <li>● Semiconductors</li> </ul>
2. Diodes may include but is not limited to:	<ul style="list-style-type: none"> <li>● Photo diodes</li> <li>● Laser</li> <li>● Zener diodes</li> <li>● Light emitting diode</li> </ul>

<b>Variable</b>	<b>Range</b>
	<ul style="list-style-type: none"> <li>● Schottky diodes</li> </ul>
3. Transistors may include but is not limited to:	<ul style="list-style-type: none"> <li>● BJTs</li> <li>● FETs</li> </ul>
4. Biasing may include but is not limited to:	<ul style="list-style-type: none"> <li>● Forward bias</li> <li>● Reverse bias</li> </ul>
5. Amplifiers may include but is not limited to:	<ul style="list-style-type: none"> <li>● RC coupled amplifiers</li> <li>● Small signal amplifiers</li> <li>● Power amplifiers</li> <li>● Tuned amplifier</li> <li>● Wide band amplifiers</li> <li>● Op-Amp amplifiers</li> </ul>

## REQUIRED KNOWLEDGE AND UNDERSTANDING

- The manufacturer's warranty requirements relating to electronics installation systems and related components.
- The legal requirements relating to electrical installations
- Kenyan legislation and workplace procedures relevant to:
  - Health and safety;
  - Environment (including waste disposal);
  - Appropriate personal protective equipment (PPE).
- Work place communication;
- Time management
- Materials management
- The importance of documentation and keeping records
- The relationship between time and costs

- The importance of using the correct sources of technical information.
- Interpreting circuits, drawings, specifications and instructions
- Preparing work plans in accordance with legislative and regulatory requirements and standard operating procedures and health and safety requirements
- Contractual agreements
  - Necessary insurance and policies including security bonds, performance bonds, contractors all risks
  - Insurance of contractor's work
  - Keeping records of income
  - Financial statements

## **FOUNDATION SKILLS**

- Communications (verbal and written);
- Proficient in logistic management;
- Time management;
- Meeting organization;
- Analytical
- Faults troubleshooting;
- Planning;
- Decision making;
- First aid;
- Report writing;
- Problem solving;
- Management

## **EVIDENCE GUIDE**

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1. Critical Aspects of Competency	<p><b>Assessment requires evidence that the candidate:</b></p> <ul style="list-style-type: none"> <li>1.1 Identified different semiconductor material as per work procedure.</li> <li>1.2 Applied diodes in electronic circuits as per work procedure.</li> <li>1.3 Applied transistors in basic electronic circuits as per work procedure.</li> <li>1.4 Identified special semiconductor devices as per work procedure.</li> <li>1.5 Performed rectification of ac power to dc power as per work procedure.</li> <li>1.6 Identified operational amplifiers as per application as per work procedure.</li> <li>1.7 Carried out wave shaping and pulse generation circuits as per standard operating procedure.</li> </ul>
2. Resource Implications	<p>The following resources <i>must</i> be provided:</p> <ul style="list-style-type: none"> <li>2.1 Appropriately simulated environment where assessment can take place.</li> <li>2.2 Access to relevant workplace environment.</li> <li>2.3 Resources relevant to the proposed activities or tasks</li> </ul>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <ul style="list-style-type: none"> <li>3.1 Practical</li> <li>3.2 Portfolio of evidence</li> <li>3.3 Third party report</li> <li>3.4 Oral questioning</li> <li>3.5 Written tests</li> </ul>
3 Context of Assessment	<p>Competency may be assessed in actual workplace or simulated workplace.</p>

4 Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.
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