



**REPUBLIC OF KENYA**

**NATIONAL OCCUPATIONAL STANDARD**

**FOR**

**COMPUTER SCIENCE TECHNICIAN**

**KNQF LEVEL 6**

**(CYCLE 3)**

**PROGRAMME ISCED CODE: 0613 554 A.**



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## APPLY BASIC ELECTRONIC SKILLS

ISCED UNIT CODE: 0613 554 07A

UNIT CODE: ICT/OS/CS/CC/01/6/MA

### Unit description

This unit specifies the competencies required to apply basic electronics skills. It involves identifying electric circuits and electronic components, understanding semi-conductor theory, identifying and classifying memories, applying number systems and binary coding and identifying emerging trends in electronics.

### ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT	PERFORMANCE CRITERIA
These describe the <b>key outcomes</b> which make up <b>workplace function</b> .	These are <b>assessable</b> 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. Identify electrical circuits	1.1 Electrical components are selected <i>Electrical quantities and their units</i> are applied. 1.3 <i>Types of electrical circuits</i> are applied
2. Identify electronic components	2.1 Electrical and electronic components are selected. 2.2 Characteristics of electronic components are applied. 2.3 Application of electronic components are applied 2.4 Characteristics of integrated circuit are applied
3. Apply semi-conductor theory	3.1 Semiconductors are selected 3.2 Structure of matter is applied. 3.3 Electrons in conductors and semiconductors are tested. 3.4 Types of semiconductor materials are applied. 3.5 P-type and N-type materials are designed 3.6 Operations of P-N junction diodes are applied 3.7 Types and <i>operations of transistors</i> are applied.

4. Identify and classify memory	4.1 <b>Types of memories</b> are applied. 4.2 <b>Memory hierarchy</b> is applied 4.3 <b>Classification of memories</b> is applied
5. Apply number systems and binary coding	5.1 <b>Types of number systems</b> are applied 5.2 Types of number systems are applied 5.3 Base conversion is performed. 5.4 Binary arithmetic operations are applied 5.5 Binary codes are applied. 5.6 Representation of decimals in BCD is applied 5.7 BCD arithmetic is performed
6. Identify emerging trends in Electronics	6.1 Emerging trends are applied 6.2 Challenges of emerging trends are applied 6.3 Coping with emerging trends is implemented

## RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environment and situations that will affect performance.

Variable	Range
1. Electrical quantities and their units may include but is not limited to:	E.M.F in volts <ul style="list-style-type: none"> <li>• Power in watts</li> <li>• Energy in joules</li> <li>• Resistance in ohms</li> <li>• Current in amperes</li> </ul>
2. Types of electrical circuits may include but is not limited to:	<ul style="list-style-type: none"> <li>• AC – Alternating Current</li> <li>• DC – Direct Current</li> </ul>
3. Types and operations of transistors may include but is not limited to:	<ul style="list-style-type: none"> <li>• Types <ul style="list-style-type: none"> <li>• PNP</li> <li>• NPN</li> </ul> </li> <li>• Operations <ul style="list-style-type: none"> <li>• Forward biasing</li> <li>• Reverse Biasing</li> </ul> </li> </ul>
4. Types of memories may include but is not limited to:	<ul style="list-style-type: none"> <li>• Semi-conductor</li> <li>• Magnetic</li> <li>• Optical</li> </ul>
5. Levels of memory storage may include but is not limited to:	<ul style="list-style-type: none"> <li>• Internal</li> <li>• Main</li> <li>• Online</li> </ul>

Variable	Range
	<ul style="list-style-type: none"> <li>• Offline bulk</li> </ul>
6. Classification of memories may include but is not limited to:	<ul style="list-style-type: none"> <li>• RAM</li> <li>• ROM</li> </ul>
7. Types of number systems may include but is not limited to:	<ul style="list-style-type: none"> <li>• Decimal</li> <li>• Binary</li> <li>• Octal</li> <li>• Hexadecimal</li> <li>• Binary Arithmetic's</li> </ul>
8. Binary codes may include but is not limited to:	<ul style="list-style-type: none"> <li>• 8421 BCD</li> <li>• Excess 3</li> <li>• BCD arithmetic's</li> </ul>

## REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

### Required skills

The individual needs to demonstrate the following skills:

- Communications (verbal and written);
- Proficient in ICT
- Time management
- Problem solving
- Decision making
- First aid

### Required knowledge

The individual needs to demonstrate knowledge of:

- Electrical Components
- Electrical Quantities and units of measurement
- Electrical circuits
- Semiconductor theory
- Number systems
- Types of Computer memories

## 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>Assessment requires evidence that the candidate:</p> <ol style="list-style-type: none"> <li>1.1 Identified Electrical Components, quantities and their units of measurement</li> <li>1.2 Constructed a simple circuit</li> <li>1.3 Identified types of transistors and their operations</li> <li>1.4 Categorized the memories according to their levels, types and hierarchy</li> </ol>
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	1.5 Identified the number systems, binary codes and their operations.
2. Resource Implications	<p>The following resources should be provided:</p> <p>2.1 Access to relevant workplace where assessment can take place</p> <p>2.2 Appropriately simulated environment where assessment can take place</p> <p>2.3 Resources relevant to proposed activity or task</p>
3. Methods of Assessment	<p>Competency may be assessed through:</p> <p>3.1 Observation</p> <p>3.2 Oral questioning</p> <p>3.3 Practical demonstration</p>
4. Context of Assessment	<p>Competency may be assessed</p> <p>4.1 Off the job</p> <p>4.2 On the job</p> <p>4.3 During industrial attachment</p>
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.