COMPETENCY BASED CURRICULUM

FOR

INFORMATION COMMUNICATION TECHNOLOGY

KNQF LEVEL 5

PROGRAMME ISCED CODE: 061 2454A

BASIC ELECTRONICS

UNIT CODE: 0714 441 04A

Duration of Unit: 100 Hours

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Basic Electronics

Unit description

This unit specifies the competencies required to apply basic electronic. It involves identifying electric circuits, identifying electronic components, applying semi-conductor theory, and classifying computer memory, applying logic gates, applying logic gates and performing Boolean algebra operations.

Summary of Learning Outcomes

Learning Outcomes	Duration (hours)
1. Identify electric circuits	10
2. Identify electronic components	10
3. Apply semi-conductor theory	20
4. Classify computer memory	10
5. Apply logic gates	30
6. Perform Boolean algebra operations	20
Total Hours	**100**

Learning Outcomes, Content, and Suggested Assessment Methods

Learning outcomes	Content	Suggested Assessment Methods

1. Identify electrical circuits	1.1 Electrical circuit identification 1.1.1 Definition of electrical circuit 1.1.2 Components of electrical circuit 1.2 Electrical quantities and their S.I units' identification 1.2.1 Basic electrical quantities and their units 1.2.1.1 **Emf** in volts 1.2.1.2 Current in Amperes 1.2.1.3 Power in watts 1.2.1.4 Energy in joules 1.2.1.5 Resistance in ohms 1.3 Types of electrical circuits 1.3.1 AC – Alternating Current 1.3.2 DC – Direct Current	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
2. Identify Electronic components	2.1 Identification of electronic components 2.1.1 Resistor 2.1.2 Capacitor 2.1.3 Diode 2.1.4 Inductor 2.2 Characteristic of electronic components. 2.3 Application of electronic components. 2.4 Characteristics of integrated circuit	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
3. Apply semi-conductor theory	3.1 Explanation of semiconductor theory 3.2 Descriptions of structure of matter 3.3 Explanation of Electrons in conductors and semiconductors 3.4 Types of semiconductor materials 3.4.1 Silicon	• Practical Activities • Project work • Demonstration • Group discussions • Observation

	3.4.2 germanium 3.5 Explanation of P-type and N-type materials 3.6 Description of P-N junction diodes 3.6.1 Forward biasing 3.6.2 Reverse biasing 3.7 Types and operations of transistors 3.7.1 PNP type 3.7.2 NPN type 3.8 Application of Semiconductor theory	• Third Party report • Portfolio of Evidence • Written tests
4. Classify computer memory	4.1 Identification of computer memories 4.1.1 Definition of computer memory 4.1.2 Classification of computer memory 4.1.2.1 Primary memory 4.1.2.2 Secondary memory 4.1.3 Types of computer memories 4.1.3.1 RAM 4.1.3.2 ROM 4.1.3.3 DAM 4.2 Identification of Memory hierarchy speed 4.2.1 Registers 4.2.2 Cache memory 4.2.3 Main memory 4.2.4 Secondary storage 4.2.5 Tertiary storage 4.3 Identification of memory storage levels 4.3.1 Internal 4.3.2 Main 4.3.3 Online 4.3.4 Offline bulk 4.4 Classify computer memories as per the technology used	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests

	4.4.1 Semiconductor memory 4.4.2 Magnetic memory 4.4.3 Optical memory	
5 Apply logic gates	5.1 Identification of Logic gates 5.1.1 Definition of terms 5.1.2 Types of logic gates 5.1.2.1 AND Gate 5.1.2.2 OR Gate 5.1.2.3 NOT Gate 5.1.2.4 NAND Gate 5.1.2.5 NOR Gate 5.1.2.6 XOR Gate 5.1.2.7 XNOR Gate 5.2 Development of Logic circuits 5.3 Simplification of Logic circuits 5.3.1 Logic circuits Simplification Methods 5.3.1.1 Boolean Algebra 5.3.1.2 K-Maps 5.3.1.3 Quine-McCluskey Algorithm 5.3.1.4 Software and CAD Tools 5.4 Application of logic gates in electronic circuits	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence • Written tests
6 Perform Boolean algebra operations	6.1 Key concepts in Boolean algebra 6.1.1 Boolean variables 6.1.2 Logical operations 6.1.3 Boolean expressions 6.1.4 Laws and rules of Boolean algebra 6.1.5 Truth tables 6.1.6 De Morgan's theorem 6.2 Demonstration of Boolean expressions as per the SOPs 6.3 Performance of Basic Boolean operations	• Practical Activities • Project work • Demonstration • Group discussions • Observation • Third Party report • Portfolio of Evidence

	6.4 Methods of simplifying Boolean expressions 6.5 Illustration of Boolean Laws and Theorems 6.6 Simplification rules for Boolean expressions	• Written tests

Suggested Delivery Methods

- Instructor led facilitation using active learning strategies
- Demonstration by trainer
- Practical work by trainee
- Viewing of related videos
- Group discussions
- Direct instructions

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	**Learning Materials**			
1.	Textbooks	For trainee's use	5 pcs	5:1
2.	Installation manuals	For trainers' use	5 pcs	5:1
3.	Flip Charts	For trainer's use	5 pcs	5:1
4.	PowerPoint presentations	For trainer's use		
B	**Learning Facilities & infrastructure**			
5.	Lecture/theory room	For training	1	25:1
6.	Laboratory	For training	1	25:1
C	**Consumable materials**	For trainee's use		

7.	Printing papers	For printing	1 ream	1:20
8.	Foolscaps	For writing	1 ream	
9.	Toners	For printers	2 pcs	13:1
10.	Assorted colour of whiteboard markers	For trainer's use		
D	**Tools and Equipment**			
11.	Computers	For training	25 pcs	1:1
12.	Projector	For trainer's use	1 pcs	25:1
13.	Printers	For printing	2 pcs	13:1
14.	Whiteboard	For trainer's use	1 pcs	25:1
15.	Ohmmeter	For training	5	5:1
16.	Ammeter	For training	5	5:1
17.	Digital Multi meter	For training	5	5:1
18.	Power supplies	For training	5	5:1
19.	Circuits	For training	5	5:1
20.	Semiconductor materials	For training	10	3:1
21.	Conductors e.g., copper, gold, silver	For training	25	1:1
22.	Insulators	For training	5	5:1
23.	Screw Drivers	For training	5	5:1
24.	Resistors	For training	5	5:1

25.	Capacitors	For training	5	5:1
26.	Logic gates	For training	5	5:1
27.	Inductors	For training	5	5:1
28.	Transistors	For training	5	5:1
29.	Transformers batteries, power supplies	For training	5	5:1
30.	Conducting wires	For training	5	5:1