

BASIC ELECTRONICS

UNIT CODE: 0714 541 09A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Basic Electronics

Duration of Unit: 100 Hours

Unit description

This unit specifies the competencies required to demonstrate basic skills of electronics. It includes managing electrical circuits, managing electronic components, applying semi-conductor theory, managing memory, applying number systems and binary coding and managing emerging trends in electronics

Summary of Learning Outcomes

LEARNING OUTCOMES	DURATION (HOURS)
1. Identify electric circuits	4
2. Identify electronic components	4
3. Apply semi-conductor theory	20
4. Classify computer memory	20
5. Apply logic gates	32
6. Perform Boolean algebra operations	20
TOTAL	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	• Practical exercises • Written • Observation • Oral

	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	
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 exercises • Written • Observation • Oral
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 exercises • Written • Observation • Oral

	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	
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	• Practical exercises • Written • Observation • Oral

	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 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 exercises • Written • Observation • Oral

6. Perform Boolean algebra operations	6.1 Identify 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 6.3 Performance of Basic Boolean operations 6.4 Methods of simplifying Boolean expressions 6.5 Illustration of Boolean Laws and Theorems 6.6 Simplification rules for Boolean expressions	• Practical exercises • Written • Observation • Oral
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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			
10.	Textbooks		13 pcs	2:1
11.	Installation manuals			

12.	Flip Charts			
13.	PowerPoint presentations	For trainer's use		
B	Learning Facilities & infrastructure			
14.	Lecture/theory room		1	25:1
15.	Laboratory		1	25:1
C	Consumable materials			
16.	Printing papers		1 ream	1:20
17.	Toners/Cartridges		2 pcs	13:1
18.	Assorted colour of whiteboard markers			
D	Tools and Equipment			
33.	Computers		25 pcs	1:1
34.	Projector		1 pc	25:1
35.	Signal testers		5 pcs	5:1
36.	Header checker		25 pcs	1:1
37.	Crimping tools		13 pcs	2:1
38.	Cable tester		5 pcs	5:1
39.	Punch Downs		5 pcs	5:1
40.	Switches		5pcs	5:1
41.	Repeaters		5pcs	5:1
42.	Routers/modem		5pcs	5:1
43.	Network tool kit		25 pcs	1:1
44.	Gateways		5pcs	5:1
45.	Packets of RJ45		300 pcs	1:10
46.	Fibre Modules (SFP)		5pcs	5:1
47.	UTP Ethernet Cable		300 meters	1:10
48.	Antistatic gloves		25 pairs	1:1
49.	Ohmmeter			
50.	Ammeter			
51.	Digital Multi meter			
52.	Power supplies			
53.	Circuits			
54.	Semiconductor materials			
55.	Conductors e.g., copper, gold, silver			
56.	Insulators			
57.	Screw Drivers			

58.	Resistors			
59.	Capacitors			
60.	Logic gates			
61.	Inductors			
62.	Transistors			
63.	Transformers batteries, power supplies			
64.	Conducting wires			