REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

COMPUTER SCIENCE

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0613 554 A.

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

BASIC ELECTRONICS

ISCED UNIT CODE: 0613 554 07A

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

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply Basic Electronic Skills

Duration of Unit: 180 hours

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.

Summary of Learning Outcomes

Learning Outcomes	Duration (hours)
1. Electric circuits	20
2. Electronic components	25
3. Semi-conductor theory	50
4. Memory	20
5. Number systems and binary coding	50
6. Emerging trends in electronics	15
TOTAL	**180**

Learning Outcomes, Content and Suggested Assessment Methods

Learning outcomes	Content	Suggested Assessment Methods
1. Electrical circuits	1.1 Definition of electrical circuit. 1.2 Basic electrical quantities and their units 1.2.1 E.m.f in volts 1.2.2 Current in Amperes 1.2.3 Power in watts 1.2.4 Energy in joules 1.2.5 Resistance in ohms 1.3 Types of electrical circuits 1.3.1 Simple a.c circuits 1.3.2 Simple d.c circuits	• Practical exercises • Written • Observation • Oral
2. 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 Identification of integrated circuit characteristics	• Practical exercises • Written • Observation • Oral
3. Semi-conductor theory	3.1 Definition of semiconductor and related terms 3.1.1 Atom 3.1.2 Atomic structure 3.2 Description of the structure of matter	• Practical exercises • Written • Observation • Oral

	3.3 Explanation of electrons in conductors and semiconductors 3.4 Types of semiconductors materials 3.4.1 Silicon 3.4.2 germanium 3.5 Explanation of P-type and N-types materials 3.5.1 P-type 3.5.2 N-type 3.6 Description of P-N junction diodes operations 3.6.1 Forward biasing 3.6.2 Reverse biasing 3.7 Operations of transistors 3.7.1 PNP type 3.7.2 NPN type	
4. Memory	4.1 Definition of memory 4.2 Classification of memories(hierarchy) 4.2.1 RAM 4.2.2 ROM 4.2.3 DAM 4.3 Types of memories 4.3.1 Semiconductor memories 4.3.2 Magnetic memories	• Written • Observation • Oral
5. Number systems and binary coding	5.1 Definition of number system and binary code 5.2 Types of number systems 5.2.1 Decimal 5.2.2 Binary 5.2.3 Octal 5.2.4 Hexadecimal	• Written • Observation • Oral

	5.3 Base conversion 5.4 Binary arithmetic 5.4.1 Addition 5.4.2 Subtraction 5.4.3 Multiplication 5.4.4 Division 5.5 Binary codes 5.5.1 8421 BCD 5.5.2 Excess-3 5.6 Represent decimal numbers in BCD 5.7 BCD arithmetic 5.7.1 Addition 5.7.2 Subtraction 5.7.3 Multiplication 5.7.4 Division	
6. Emerging trends in Electronics	6.1 Description of emerging trends 6.2 Explanation of challenges of emerging trends 6.3 Coping with the emerging trends	• Written • Observation • Oral

Suggested Methods of Instruction

- Presentations and practical demonstrations by trainer;
- Guided learner activities and research to develop underpinning knowledge;
- Supervised activities and projects in a workshop;
- Visiting lecturer/trainer from the ICT sector;
- Industrial visits.

Recommended Resources for 25 trainees

S/No.	Category	Item Description / Specifications	Quantity	Trainee:Item Ratio
1.	**Learning Materials**	Textbooks	25	1:1
2.		Handouts	25 Sets	1:1
3.		Access to online resources	25 Logins	1:1
4.	**Learning Facilities**	Electronics lab/classroom with benches, storage, ventilation	1 Room	Shared
5.		Whiteboard, projector/smart board	1	1:25
6.	**Infrastructure**	Reliable power supply and backup (UPS/generator)	1 Setup	Shared
7.	**Consumable Materials**	Resistors, capacitors, diodes, ICs, wires, breadboards, soldering wire	Assorted	Shared
8.		Notebooks, pens, datasheets, handouts	25 Sets	1:1
9.	**Tools & Equipment**	Multimeters (digital)	10	1:2.5
10.		Breadboards	25	1:1
11.		Soldering stations with accessories	10	1:2.5
12.		Power supply units (0–30V adjustable)	10	1:2.5
13.		Oscilloscopes (for circuit testing and signal analysis)	5	1:5
14.		Component kits (resistors, capacitors, diodes, transistors, ICs)	25 Kits	1:1
15.		Desktop/laptop with simulation software (e.g., Multisim, Proteus, Tinkercad)	25	1:1