REPUBLIC OF KENYA

COMPETENCY BASED MODULAR CURRICULUM

FOR

NETWORK SYSTEM TECHNICIAN
KNQF LEVEL 5

PROGRAMME CODE: 0612 454A

COMPUTER NETWORK DESIGN

UNIT CODE: 0612 451 05A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Design Computer Network

Unit Duration: 200 Hours

Unit Description

This unit covers the competencies required to design a computer network. It involves performing computer network site survey, designing computer network topology and documenting the network design.

Learning Outcomes	Duration (Hours)
1. Perform Computer network site survey	60
2. Design Computer network topology	100
3. Document Computer network design	40
TOTAL	**200**

Summary of Learning Outcomes

Learning Outcomes, Content, and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Perform Computer network site survey	1.1 Evaluation of Network infrastructure 1.1.1. Introduction to computer networks 1.1.2. Advantages and disadvantages of computer networks	• Practical Assessment • Project • Portfolio of evidence • Oral questioning

	1.1.3. Purpose and scope of computer networks. 1.1.3.1 Scalability 1.1.3.2 Resilience 1.1.3.3 Quality of service 1.1.3.4 compatibility 1.1.4. Application of computer networks. 1.1.5. Types of computer networks. 1.1.6. Components of computer networks. 1.1.7. Types of computer networking transmission media. 1.1.8. Computer network topologies. 1.2 Identification of network needs 1.2.3 Conducting needs analysis 1.2.4 Advantages and disadvantages of network needs 1.2.5 Importance of network needs Communication 1.2.5.1 Resource sharing 1.2.5.2 Data sharing and collaboration 1.2.5.3 Internet access 1.2.5.4 Data back-up and recovery 1.2.5.5 Security 1.2.5.6 Fault tolerance and Redundancy 1.3 Fundamentals of Network Design 1.3.3 Key concepts of network design 1.3.4 Importance of network design	• Interviews • Third party report • Written Assessment • Case study

	1.3.5 Factors to consider in network design 1.3.5.1 Security 1.3.5.2 Fault tolerance 1.3.5.3 High performance 1.3.5.4 Reliability 1.3.5.5 Number of users 1.3.5.6 Scalability 1.3.5.7 Performance 1.3.5.8 Flexibility 1.3.5.9 QOS 1.3.5.10 Accessibility 1.3.6 Network design tools 1.3.6.1 Software design tools 1.4 Computer network site layout design 1.4.3 Types of network sites 1.4.4 Factors to consider when designing a site layout 1.4.5 Site layout plan development 1.5 Computer network Transmission media 1.5.1 Introduction to transmission media 1.5.2 Categories of transmission media 1.5.2.1 Bound/wired 1.5.2.2 Unbound/wireless 1.5.3 Types of transmission media 1.5.3.1 Coaxial cable 1.5.3.2 Fibre Optic 1.5.3.3 Twisted pair cable	

	1.5.3.4 Satellite 1.5.3.5 Microwave 1.5.4 Selection criteria for transmission media 1.6 Computer network E-waste management 1.6.1 Definition of terms 1.6.2 Advantages and disadvantages of managing E-waste 1.6.3 Laws and regulations governing E-waste management in Kenya 1.6.4 Types of E-waste 1.6.4.1 Obsolete servers 1.6.4.2 Obsolete switches and routers 1.6.4.3 Networking cables and connectors 1.6.4.4 Obsolete computers and computer accessories 1.6.5 Procedures for disposing E-waste 1.7 Green energy in computer networking 1.7.1 Key concepts in green energy 1.7.2 Designing sustainable computer network 1.7.2.1 Renewable energy sources 1.7.2.2 Energy efficient hardware 1.7.2.3 Virtualization and Consolidation 1.7.2.4 Energy aware routing	

	1.7.2.5 Energy monitoring and reporting 1.7.3 Pros and cons of green energy in computer networking	
2. Design Computer network topology.	2.1 Network plan design. 2.1.1 Floor design 2.1.2 Wireless design 2.2 Tools and components for designing computer networks. 2.2.1 Tools for designing computer networks 2.2.1.1 Software tools 2.2.2 Computer network components and their functions 2.2.2.1 Gateways 2.2.2.2 NIC 2.2.2.3 Router 2.2.2.4 Switch 2.2.2.5 Modem 2.2.2.6 Firewall 2.2.2.7 Wireless access point 2.2.2.8 Repeaters 2.3 Determining network device location 2.3.1 IEEE Standards Requirements 2.3.2 Determining Device location Placement 2.3.2.1 Switch 2.3.2.2 Router 2.3.2.3 Wireless Access points 2.4 Computer network topology design 2.4.1 Key Concepts	• Practical Assessment • Project • Portfolio of evidence • Oral questioning • Interviews • Third party report • Written Assessment • Case study

	2.4.2 Types of network topology 2.4.2.1 Star 2.4.2.2 Ring 2.4.2.3 Bus 2.4.2.4 Mesh 2.4.2.5 Hybrid 2.4.3 Criteria for selecting network topology design	
3. Document Computer network configurations	3.1 Computer Network documentation policy. (IEEE 802.11, 802.3) 3.1.1 Network performance report 3.1.2 Security report 3.1.3 Inventory report 3.1.4 Usage report 3.1.5 Incident report 3.2 Computer Network topology diagram 3.2.1 Physical topology diagrams 3.3 Network Mapping documentation 3.3.1 Device names, roles and IP address documentation.	● Practical Assessment ● Project ● Portfolio of evidence ● Oral questioning ● Interviews ● Third party report ● Written Assessment ● Case study

Suggested Methods of delivery

- Role playing
- Viewing of related videos
- Group discussions.
- Instructor led facilitation using active learning strategies.
- Projects.
- Demonstrations.
- Site visits.

Recommended Resources for 25 Trainees

S/No.	Category/Item	Description/ Specifications	Quantity	Recommended Ratio (Trainee: Item)
A	**Learning Materials**			
1.	Textbooks		13 pcs	2:1
2.	Installation manuals			
3.	Flip Charts			
4.	PowerPoint presentations	For trainer's use		
B	**Learning Facilities & infrastructure**			
5.	Lecture/theory room		1	25:1
6.	Laboratory		1	25:1
C	**Consumable materials**			
7.	Printing papers		1 ream	1:20
8.	Toners/Cartridges		2 pcs	13:1
9.	Assorted colour of whiteboard markers			
D	**Tools and Equipment**			
1.	Computers		25 pcs	1:1
2.	Projector		1 pc	25:1
3.	Signal testers		5 pcs	5:1
4.	Header checker		25 pcs	1:1
5.	Crimping tools		13 pcs	2:1
6.	Cable tester		5 pcs	5:1
7.	Punch Downs		5 pcs	5:1
8.	Switches		5pcs	5:1
9.	Repeaters		5pcs	5:1

10.	Routers/modem		5pcs	5:1
11.	Network tool kit		25 pcs	1:1
12.	Gateways		5pcs	5:1
13.	Packets of RJ45		300 pcs	1:10
14.	Fibre Modules (SFP)		5pcs	5:1
15.	UTP Ethernet Cable		300 meters	1:10
16.	Antistatic gloves		25 pairs	1:1