REPUBLIC OF KENYA

NATIONAL OCCUPATIONAL STANDARD

FOR

COMPUTER SCIENCE TECHNICIAN

KNQF LEVEL 6

(CYCLE 3)

PROGRAMME ISCED CODE: 0613 554 A.

TVET CDACC
P.O. BOX 15745-00100
NAIROBI

CREATE NETWORKS AND DISTRIBUTED SYSTEMS

ISCED UNIT CODE: 0613 554 03A

UNIT CODE: ICT/OS/CS/CR/07/6/MA

UNIT DESCRIPTION:

This unit specifies the competencies required to understand networking and distributed systems concepts. It involves understanding networking and distributed systems, distributed system architectures, distributed processing and file management, setting up a network in a distributed environment, understanding data communication standards and IP addressing and troubleshooting a network.

ELEMENT These describe the **key outcomes** which make up **workplace function**.	**PERFORMANCE CRITERIA** These are **assessable** statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range.)***
1. Apply networking and distributed systems concepts	1.1 Fundamentals of networking are applied 1.2 ***Types of networks*** are selected 1.3 ***Network topologies*** are applied 1.4 Transmission media are terminated 1.5 Distributed system is configured 1.6 ***Types of distributed systems*** are applied 1.7 ***Models in distributed systems*** are chosen 1.8 Network requirements are specified 1.9 Network security is configure based on local threats 1.10 Components of network security are applied 1.11 Wireless security is applied
2. Create distributed systems architectures	2.1 Distributed architecture is selected and created 2.2 ***Architecture styles*** are applied 2.3 Classification of ***types of distributed system architectures*** are applied 2.4 Distributed system architecture requirements for a simulated site are analyzed
3. Create distributed processing and file management	3.1 ***Types of distributed processing*** are applied 3.2 File systems are implemented 3.3 ***File sharing and accessing methods*** are implemented 3.4 Distributed file sharing and access are implemented
4. Set up network in distributed environment	4.1 Tools, materials and devices for network set up are assembled according to the network type

ELEMENT These describe the **key outcomes** which make up **workplace function**.	**PERFORMANCE CRITERIA** These are **assessable** statements which specify the required level of performance for each of the elements. ***(Bold and italicized terms are elaborated in the range.)***
	4.2 Network devices are connected and configured according to local and international standards 4.3 Network software is installed and configured according to the user manual 4.4 Network performance is tested
5. Apply Data Communication Standards and IP addressing	5.1 OSI Model is applied 5.2 Data communication components are applied 5.3 Network IP address classes are configured
6. Troubleshoot a network	6.1 Troubleshooting techniques are applied 6.2 Troubleshooting tools are selected. 6.3 Troubleshooting is performed.

RANGE

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

Variable	**Range**
1. Types of networks may include but not limited to:	• LAN • WAN • MAN • PAN
2. Network topologies may include but not limited to:	• Bus • Star • Delta • Ring • mesh point-to-point
3. Types of distributed systems may include but not limited to:	• Computing • Information • Pervasive
4. Models in distributed 5. systems may include but not limited to:	• Architecture • Interaction • Fault
6. Architecture styles may include but not limited to:	• Layered Architecture • Object Based Architecture • Data-centered Architecture • Event Based Architecture • Hybrid Architecture

Variable	Range
7. Types of distributed system architecture may include but not limited to:	● Centralized ● Decentralized ● Hybrid
8. Types of distributed processing	● Distributed ● Parallel
9. File sharing and access methods may include but not limited to:	● Remote Access ● Data-Caching
10. Troubleshooting tools may include but not limited to:	● Ping ● Tracert / traceroute ● Nslookup ● Netstat ● Pathping/mtr

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);
- Time management;
- Problem solving;
- Planning;
- Decision Making;
- Research

Required knowledge

The individual needs to demonstrate knowledge of:

- Fundamentals of networking and distributed systems
- Distributed systems architectures
- Distributed processing and file management
- Setting up a network in a distributed environment
- Troubleshooting a network

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

1. Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Analyzed network requirements for a site 1.2 Selected network as per user requirement 1.3 Applied Network topologies 1.4 Terminated transmission media

	1.5 Configured distributed system 1.6 Selected and created distributed architecture 1.7 Analyzed distributed system architecture requirements for a simulated site 1.8 Created file sharing and accessing methods 1.9 Carried out distributed file sharing and access 1.10 Connected and configured Network devices according to local and international standards 1.11 Installed and configured Network software according to the user manual 1.12 Tested Network performance 1.13 Outlined OSI Model 1.14 Configured Data communication components 1.15 Configured Network IP address classes 1.16 Performed Troubleshooting of network as per IEEE standards
2. Resource Implications	The following resources should be provided: 2.1 Access to relevant workplace where assessment can take place 2.2 Appropriately simulated environment where assessment can take place 2.3 Resources relevant to proposed activity or task
3. Methods of Assessment	Competency may be assessed through: 3.1 Oral tests 3.2 Observation 3.3 Practical demonstration 3.4 Written tests
4. Context of Assessment	Competency may be assessed 4.1 Off the job 4.2 on the job 4.3 During industrial attachment
5. Guidance information for assessment	5.1 Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.