NETWORKING AND DISTRIBUTED SYSTEMS

UNIT CODE:ICT/CU/CS/CR/07/6/B

Relationship to Occupational Standards

This unit addresses the unit of competency: Understand Networking and Distributed Systems

Duration of Unit: 210 hours

Unit description:

This unit specifies the competencies required to understanding networking and distributed systems concept. 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.

Summary of Learning Outcomes

1. Understand networking and distributed systems
2. Understand distributed systems architectures
3. Understand distributed processing and file management
4. Set up a network in a distributed environment
5. Understand Data Communication Standards and IP addressing
6. Troubleshoot a network

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods

1. Understand networking and distributed systems concepts	• Fundamentals of networking
	  • Definition of network
	  • Definition of network terminologies
	  • Identified network components
	  • Application and benefits of networking
	• Types of networks
	  • LAN
	  • MAN
	  • WAN
		• Written tests
		• Observation
		• Oral tests
		• Practical tests

	• PAN
	• Network topologies
	  • Star
	  • Ring
	  • Mesh
	  • Bus
	• Transmission media
	  • Wired media
	  • Wireless media
	• Distributed system
	  • Definition
	  • Application
	• Types of distributed systems
	  • Computing
	  • Information
	  • Pervasive
	  • Client server
	  • Peer to peer
	• Distributed systems models
	  • Architectural
	  • Interaction
	  • Fault
	• Specifying network requirements for a site
	  • Type of network
	  • Type of topology
	  • Devices
	• Network security
	  • Definition
	  • Types of network attacks
	  • Active
	  • Passive
	• Components of network security
	  • Network access control
	  • Firewall
	  • Intrusion prevention
	  • Security information and event management	

	• Wireless security	

2. Understand distributed systems architectures	• Distributed architecture
	  • Definition
	  • Application
	• Architecture styles
	  • Layered Architecture
	  • Object Based Architecture
	  • Data-centred Architecture
	• Types of distributed system architectures
	  • Centralized
	  • Decentralized
	  • Hybrid
	• Specifying distributed system architecture requirements for a simulated site
	  • Architecture style
	  • Type of distributed system architectures
		• Written tests
		• Observation
		• Oral tests
		• Practical tests

3. Understand distributed processing and file management	• Types of distributed processing
	  • Distributed processing
	  • Parallel processing
	• Types of file systems
	• File sharing and accessing methods
	  • Remote access
	  • Data caching
	• Demonstration of distributed file sharing and access
		• Written tests
		• Observation
		• Oral tests
		• Practical tests

4. Set up a network in a distributed environment	• Selection of tools, materials and devices • Connection and configuration of network devices • Installation and configuration of network software • Testing the network	• Written tests • Observation • Oral tests • Practical tests

5. Understand Data Communication standards and IP addressing	• OSI model
	  • Definition
	  • Functions of different OSI model layers
	  • OSI layer Protocols are illustrated
	• Data communication components
	  • Message
	  • Sender
	  • Receiver
	  • Medium
	  • Protocol
	• Network IP Address classes
	  • Class A, B, C
	  • Public and Private IP Address
	  • Automatic Private IP Address	

6. Troubleshoot a network	• Troubleshooting
	  • Definition
	  • Techniques
	  • Procedures
	• Troubleshooting tools
	  • Ping
	  • Tracert/traceroute
	  • Nslookup
	  • Netstat
	  • Pathping/mtr
	• Demonstration of network troubleshooting as per IEEE standard
		• Written tests
		• Observation
		• Oral tests
		• Practical tests

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 site;
- Visiting lecturer/trainer from the ICT sector;
- Industrial visits.

Recommended Resources

Tools

- Network tool kit
- Signal testers
- Spam Blacklists
- URL Encode
- Header checker
- LanTEK III cable certifier
- Crimpers (RJ45, Hex Coax)
- Punch Down Tools.
- Wire Strippers & Cutters.
- Network Testers.
- Tone & Probes.
- Cable Installation Tools.
- Coaxial & RG6 Tools.

Equipment

- Computer
- Switches
- Routers
- Modem
- Bridges
- Repeaters
- Fibre modules
- Gateways

Materials and supplies

- Hand cleaner.

Reference materials

- Manufacturers service manuals for Network equipment
- Trainer-recommended resources including web resources