NETWORKING AND DISTRIBUTED SYSTEMS

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

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	• Written tests • Observation • Oral tests • Practical tests

	✓ WAN ✓ 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 o Active o 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	• Written tests • Observation • Oral tests • Practical tests

	• Installation and configuration of network software • Testing the network	
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