Subject Code	Subject Name	Period per Week		Credit
28562	**Computer Networking**	T	P	C
		2	3	3

Rationale	Computer Networking is the most significant area of diploma in Computer Science & Technology. To work with Computer Networking should have the knowledge, skills and attitude of Computer Network fundamentals, Topologies and protocols. The OSI reference model. Functions of the Physical layer and Data Link layer, Network layer and Transport layer Network Interface Cards (NIC), Hubs, Repeaters, Bridges and Switches, LAN and provide services of Network, Network Addressing and Client Server Network**.**
Learning Outcome (Theoretical)	**After Completing the subject, students will be able to:** 1. State Computer network basics. 2. Explain Network topologies. 3. Describe OSI model. 4. Interpret communication and network protocols 5. Explain Physical layer and Data Link layer 6. Describe Network layer and Transport layer 7. Interpret Presentation layer and Session Layer 8. Discuss Network devices. 9. Illustrate Sub-netting, VLSMs, and Summarization. 10. Analyze the Features of Client Server Network.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** 1. Identify different types of connectors. 2. Identify Network hardware's 3. Prepare network cables 4. Establish a Peer to Peer/Workgroup LAN 5. Perform the task to Work with a Peer/Workgroup LAN 6. Perform Installation and configuration of windows server 7. Connect internet to the existing Lan. 8. Configure windows firewall, defender and ping. 9. Manage cloud network (google/yahoo drive). 10. Establish a client–Server Local Area Network.

Detailed Syllabus (Theory)

Unit	Topics with contents	Class (1 Period)	Final Marks
1	**Computer network** 1.1 Define Computer Network. 1.2. State the concept of computer Network. 1.3 Mention elements of computer network. 1.4 Describe the advantages of Computer network. 1.5 State the application of computer network. 1.6 Describe client / server and peer-to-peer network. 1.7 State LAN, MANs and WANs. 1.7 Describe the general features of LAN, MANs and WANs.	2	4
2	**Network topologies** 2.1 Define topology. 2.2 Difference between physical and logical topology. 2.3 Define point-to-point and multi point connections. 2.4 List different types of topologies. 2.4 Describe the physical connection of bus, ring, star and hybrid topologies. 2.5 Mention the advantages and disadvantages of bus, ring, star and hybrid topologies. 2.6 Describe the factors to select a particular topology. 2.7 Describe the logical topologies of a token ring network.	3	8
3	**OSI model** 3.1 Define communication standards. 3.2 Define OSI Model & DoD model. 3.3 Differentiate between DoD model and the OSI reference model. 3.4 List the global forum and regulatory authority of communication and computer Network sector. 3.5 State the function of IEEE in the communication and computer Network sector. 3.6 State International Standard organization-ISO. 3.7 Describe the necessity to develop OSI Model. 3.7 Describe the functions of each layer of the OSI reference model.	3	8

4	**Communication and network protocols** 4.1 Define network protocol. 4.2 Describe the main elements of protocol. 4.3 Describe the characteristics of different types of protocol. 4.4 Describe the functions of protocol. 4.5 List different types of network protocols. 4.6 State TCP/IP. 4.7 State the advantages and disadvantages of OSI and TCP/IP. 4.8 Describe the functions of TCP/IP.	**4**	**8**
5	**Physical layer and Data Link layer of the OSI Reference Model** 5.1 Draw the position diagram of Physical layer in the Internet model. 5.2 Describe the functions and services of Physical layer. 5.3 Draw the position diagram of Data link layer in the Internet model. 5.4 Describe the duties and responsibilities of Data link layer. 5.5 State the functions of LLC and MAC sub layer. 5.6 Describe the function of network connectivity devices used in Physical and Data link layers (Repeater, modems, Hub/ Switch and bridge)	**3**	**4**
6	**Network layer and Transport layer of the OSI reference model.** 6.1 Draw the position diagram of Network layer and Transport layer. 6.2 Describe the functions of Network layer and Transport layer. 6.3 Describe Transmission control protocol- TCP and user datagram Protocol -UDP. 6.4 Describe IP, RIP, OSPF, and EIGRP. 6.5 Describe the responsibilities of Network layer and Transport layer. 6.6 Describe the function of Router and Switch.	**3**	**8**
7	**Presentation layer, Session Layer and Application layer of the OSI reference model** 7.1 Draw the position diagram of Presentation layer, Session Layer and Application layer. 7.2 Describe presentation layer protocol. 7.3 Describe Session layer protocol. 7.4 Describe Application layer protocol 7.5 State Telnet, SMTP, NFS, and FTP. 7.6 Describe the functions and services of Presentation layer, Session Layer and Application layer.	**3**	**4**
8	**Hubs, Repeaters, Bridges, Switches and Routers** 8.1 List the different network device.	**4**	**8**

	8.2 Mention the layer of different network device. 8.3 Describe the functions of Hubs, Repeaters, Bridges Switches and Routers. 8.4 Mention the types of Hubs/ Switches. 8.5 Describe the important features of passive, active and intelligent Hubs/ Switches. 8.6 Describe the important features of Repeaters, Bridges, Switches and Routers. 8.7 Differentiate among Bridges, Repeaters, Switches and Routers.		
9	**Sub-netting, VLSMs, and Summarization** 9.1. Define Sub-netting. 9.2. State Classless inter domain routing (CIDR). 9.3. Define Variable length subnet mask (VLSMs) 9.4. Describe VLSM design. 9.5 State the procedure to implement VLSM Network 9.6. Define Summarization.	**4**	**4**
10	**Operation and features of Client Server Network.** 10.1 Define Client Server Network. 10.2 Describe role of Client Server Network. List different type of server. 10.3 Describe DNS Server, Web Server, Mail Server, Proxy server, File Server and DHCP Server. 10.4 State the Advantages & Disadvantages of Client Server Network.	**3**	**4**
	TOTAL	**32**	**60**

DETAILED SYLLABUS (PRACTICAL)

SL.	EXPERIMENT NAME	Class (3 Period)	Marks (Continuous)
1	**Identify Network Media** 1.1 Collect the cables and computer networking Tools. 1.2 Identify RJ45, BNC and MT-RJ connectors. 1.3 Identify the cables 1.4 Identify Network Interface Cards/LAN cards/ Network Adaptor. 1.5 Identify Modems, Hubs, Repeaters, Switches & Routers. 1.6 Find out the ports of the above devices. 1.7 Check the specifications of the devices.	**2**	**3**
2	**Work with network cables and Connectors.** 2.1 Connect RJ45 Connector with UTP Cable 2.2 Make a straight through cable. 2.3 Make a Cross over cable. 2.4 Check the cable-by-cable tester. 2.5 Connect Patch Cord and SFP Module.	**2**	**2**

3	**Establish a wired Peer to Peer/Workgroup LAN** 3.1 Collect network cable, connector, network switch / Router and tools. 3.2 Install Network Interface Card (NIC) into the PC. 3.3 Connect cable with connector and network port. 3.4 Check the MAC address of the Network Interface Card (NIC). 3.5 Configure the TCP/IP in each PC 3.6 Test the connectivity among PCs using Ping Command.	**2**	**3**
4	**Establish a wireless (Wi-Fi) Peer to Peer/Workgroup LAN** 4.1 Collect Wi-Fi network devices. 4.2 Install Wireless Lan Card into the PC. 4.3 Connect multiple Pcs with Wireless LAN. 4.4 Test the connectivity among PCs using Ping Command.	**1**	**2**
5	**Perform the task to Work with a Peer/Workgroup LAN environment for simple data communication.** 5.1 Share the Files, folders, Pen drive and Secondary memory. 5.2 Install Network Printer. 5.3 Print documents from Network Printer. 5.4 Share DVD Drive and other resources.	**2**	**3**
6	**Install and configure windows server** **6**.1. Install Windows server 2012/2019/2022 into a PC. 6.2. Perform the task to configure the Active Directory. 6.3. Configure TCP/IP to server and client PCs. 6.4. Maintain the record of performed task.	**2**	**3**
7	**Connect internet to the existing Lan.** 7.1. Prepare the equipment list. 7.2. Install and configure a Router with a PC of LAN. 7.3. Configure subnet for the LAN. 7.4. Ensure and Browse Internet from different PCs. 7.5. Maintain the record of performed task.	**1**	**2**
8	**Configure windows firewall, defender and ping.** **8**.1. Prepare the equipment list. 8.2. Configure **windows** Firewall, Defender of a PC to the LAN. 8.3. Perform Ping command for the PCs of LAN. 8.4. Maintain the record of performed task.	**1**	**3**
9	**Manage cloud network (google/yahoo drive).** 9.1. Prepare the equipment list. 9.2. Create a google/yahoo account. 9.3. Access the google/yahoo drive. 9.4. Share and manage google/yahoo drive. 9.5. Maintain the record of performed task.	**1**	**2**
10	**Establish a Client–Server Local Area Network** 10.1 Install Windows server 2012 into a server PC 10.2 Configure TCP/IP to server and client PCs 10.3 Perform the task to configure the Active Directory 10.4 Perform the task to configure the DNS.	**2**	**2**
	Total	**16**	**25**

NECESSARY RESOURCES (TOOLS, EQUIPMENT AND MACHINERY):

SL	Item Name	Quantity
1	Network tool box	10 nos
2	Cat6 and Fiber Optic cable	5 box
3	RJ 45 connector	300 nos
4	Patch Cord and SFP Module	10 nos
5	Splicer Machine	5 nos
6	Crimping tool	10 nos
7	Cable tester	10 nos
8	Hub	05 nos
9	Repeater	10 nos
10	Network Switch-8 Ports	5 nos
11	Network Switch- 24 Ports	5 nos
12	Network Switch-48 Ports	5 nos
13	Router (Wireless)	10 nos
14	Cisco Router	05 nos
15	Mikrotik Router (5P, 8P, 16P)	10 nos
16	Brouter	5 nos
17	Desktop PC	20 nos
18	Laser Printer	5 nos
19	Internet connection	At least 20Mbps
20	Windows server 2012/2019/2022 DVD(Licensed)	10 nos

RECOMMENDED BOOKS:

SL	Book Name	Writer Name	Publisher Name & Edition
01.	Data Communications and Networking	Behrouz A. Forouzan	McGraw Hill 5th Edition
02.	Computer Networks	Andrew S.Tanenbaum	PRENTICE HALL 5th Edition
03.	DATA COMMUNICATION & NETWORKING	YEKINI N. ASAFE ADEBARI F. ADEBAYO BELLO OLALEKAN	Computer Engineering Department Yaba College of Technology Lagos Nigeria
04.	Official Certificate Guide	Wendell Odom	Cisco press
05.	Cisco Certificate Network Associate study Guide	Todd Lammle	Sybex.

WEBSITE REFERENCES:

SL	Web Link	Remarks
1	(a) Website: https://en.wikipedia.org/wiki/Data_communication (b) Website: https://en.wikipedia.org/wiki/Computer_network (c) Website: https://en.wikipedia.org/wiki/Windows_Server (d) Website: https://en.wikipedia.org/wiki/Cloud_storage (e) Website: https://en.wikipedia.org/wiki/Cloud_computing	Search here with given link
2	www.youtube.com	Search here with topics
3	www.google.com	Search here with topics