CCNA: Introduction to Network

**Module 4 – 4.1: Purpose of the Physical Layer**

**A. Overview about the Physical Layer**

- The physical layer of the OSI model sits at the bottom of the stack.

- It is part of the Network Access layer of the TCP/IP model.

- The physical layer is responsible for converting digital data (bits) into signals that can be sent over a physical medium (cables, wireless signals, etc.)

- Networks rely on the physical layer to establish connections between devices. It defines the hardware and protocols for connecting devices, such as cables, connectors, and wireless frequencies.

- The physical layer provides the foundation for all other network layers.

- The internet and all modern forms of communication rely on the physical layer

=> In essence, the absence of the physical layer would render networks useless. It is the bedrock upon which all network communication is built.

**B. The Physical Connection**

- Physical Connection is Essential: All network communication, whether local (like a home printer) or remote (like a website), requires a physical connection to a local network.

- Two Types of Physical Connections:

* Wired: Uses cables (e.g., computers connected to a switch in an office). Data travels through the cable.
* Wireless: Uses radio waves (e.g., laptops, tablets, smartphones). Data travels wirelessly. Requires a wireless access point (AP) or router.

- Network Setup Determines Connection Type: The network infrastructure dictates whether wired or wireless connections are used. Corporate offices often use wired connections, while wireless is common in homes and businesses for mobile devices.

- Wireless Advantages: Wireless connectivity is popular due to its flexibility and convenience

- These are the components of an access point:

* The wireless antennas (These are embedded inside the router version shown in the figure above.)
* Several Ethernet switchports
* An internet port

**C. Wired Connection to Wireless Router**

- NICs are Essential for Network Connection: Network interface cards (NICs) are required for devices to connect to a network.

- Two Main NIC Types:

* Ethernet NIC: Used for wired connections (e.g., Ethernet cable).
* WLAN NIC: Used for wireless connections.

- Devices May Have One or Both: Devices can have either an Ethernet NIC, a WLAN NIC, or both.

- Connection Type Depends on NIC: The type of NIC present determines how a device can connect to the network. A printer with only an Ethernet NIC *must* use a cable; a tablet with only a WLAN NIC *must* connect wirelessly.