- ## Various networks cable and connectors.

1. Twisted Pair Cable:

Network Cable Type : Guided Media

Description :

- Twisted pair cable is special type cabling that is used in telephone communication and Ethernet network.
- This cable is made with two separate insulated copper wires, which are twisted together with each other as well as run in parallel form.
- The copper wires are persisted with 1mm in diameter. One of them wires helps to transmit data and another is used to get ground reference.

`Shielded Twisted Pair :

- Shielded twisted pair (STP) is a special kind of copper telephone and local area network (LAN) wiring used in some business installations.

Unshielded Twisted Pair :

- Unshielded Twisted-pair Cabling, or UTP cabling, is Twisted-pair cabling with no internal shielding. The outer insulating jacket protects the cable from physical stress or damage but does not shield the cable from electromagnetic interference (EMI).
- Unshielded twisted-pair cabling (UTP) is the most common form of network cabling for workgroups and departmental local area networks (LANs) because of its low cost, flexibility, and good performance.


2. Coaxial Cable :

Network Cable Type :Guided Media
Description :

- Coaxial cables, commonly called coax, are copper cables with metal shielding designed to provide immunity against noise and greater bandwidth.
- Coax can transmit signals over larger distances at a higher speed as compared to twisted pair cables.
- Coax has a central core of stiff copper conductor for transmitting signals. This is covered by an insulating material.
- The insulator is encased by a closely woven braided metal outer conductor that acts as a shield against noise.

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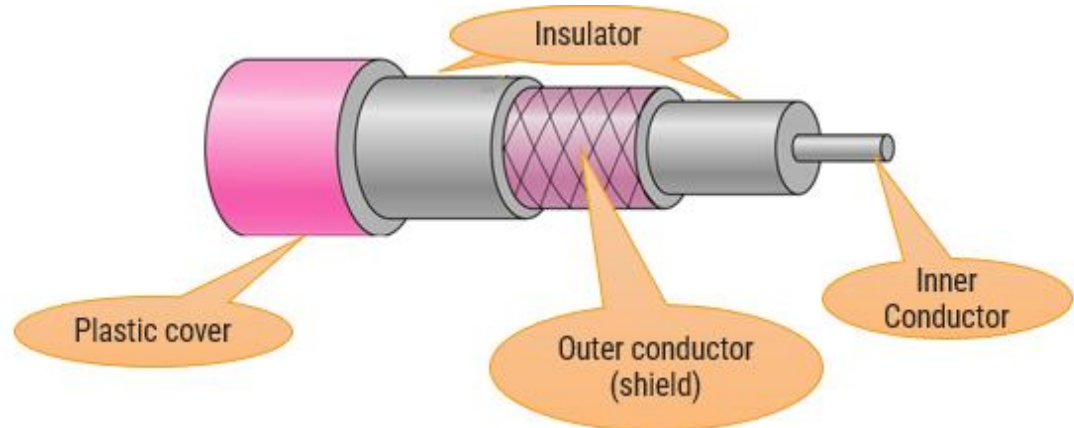
cables are categorized into three types as per radio government (RG) ratings –

- RG – 59: Has impedance of 75W and used in cable TV
- RG – 58: Has impedance of 50W and used in thin Ethernet
- RG – 11: Has impedance of 50W and used in thick Ethernet

- **Applications of Coaxial Cables :**
  - In analog telephone networks: A single coaxial network can carry about 10,000 voice signals.
  - In digital telephone networks: A coax has a data rate of 600 Mbps.
  - In cable TV networks
  - In traditional Ethernet LANs
  - In MANs

- It has Excellent noise Immunity.
- It has higher frequency as compared to Twisted Pair Cable.

3. Fiber Optic Cable   :

Network Cable Type : Guided Media

Description :

- A fiber optic cable is a <u>network cable</u> that contains strands of glass fibers inside an insulated casing.
- They're designed for long-distance, high-performance data networking, and telecommunications. Compared to wired cables, fiber optic cables provide higher bandwidth and transmit data over longer distances.
- Fiber optic cables support much of the world's internet, cable television, and telephone systems.

❖ How Fiber Optic Cables Work

- A fiber optic cable consists of one or more strands of glass, each only slightly thicker than a human hair.
- The center of each strand is called the core, which provides the pathway for light to travel.
- The core is surrounded by a layer of glass called cladding that reflects light inward to avoid loss of signal and allow the light to pass through bends in the cable.
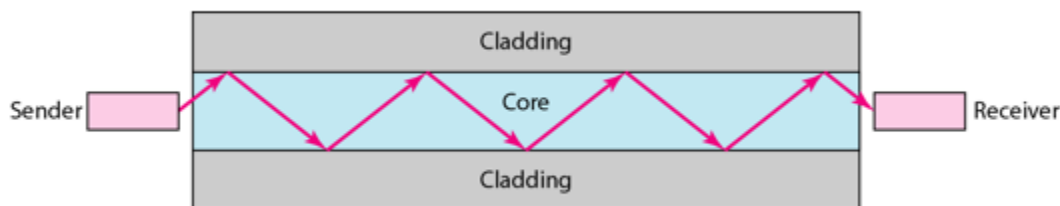
- The two primary types of optical fiber cables are single mode and multi-mode.
- Single-mode fiber uses extremely thin glass strands and a laser to generate light, while multi-mode optical fiber cables use LEDs.
- Single-mode optical fiber networks often use Wave Division Multiplexing techniques to increase the amount of data traffic that the strand can carry.
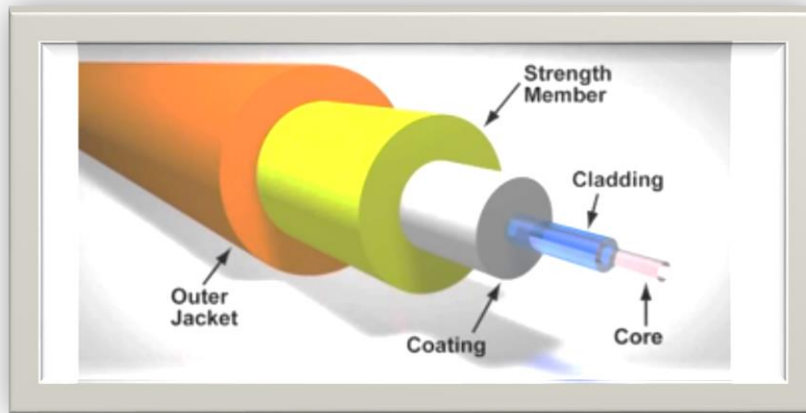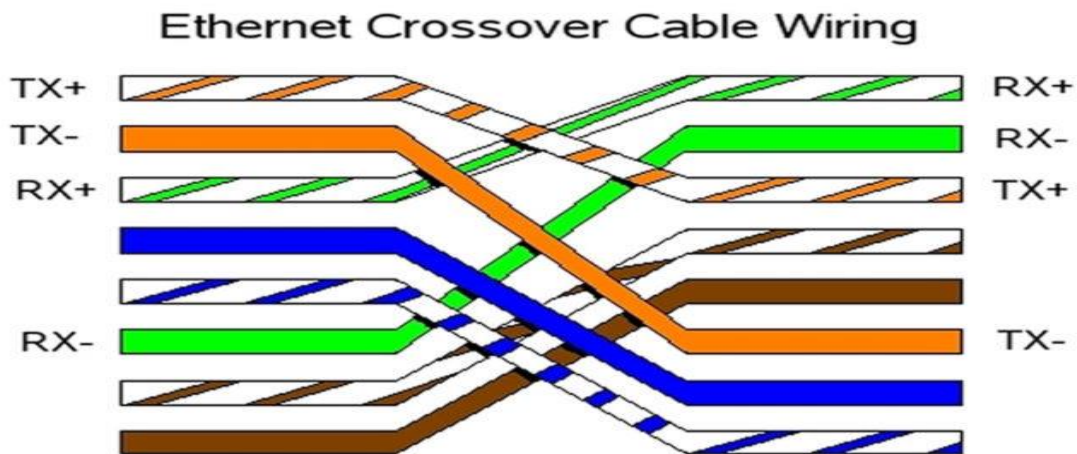
- WDM allows light at multiple different wavelengths to be combined (multiplexed) and later separated (de-multiplexed), effectively transmitting multiple communication streams through a single light pulse.

❖ Advantages of Fiber Optic Cables

- Fiber optics support a higher capacity. The amount of network bandwidth a fiber cable can carry easily exceeds that of a copper cable with similar thickness. Fiber cables rated at 10 Gbps, 40 Gbps, and 100 Gbps are standard.

- Because light can travel for much longer distances over a fiber cable without losing its strength, the need for signal boosters is lessened.

- A fiber optic cable is less susceptible to interference.
- A copper network cable requires shielding to protect it from electromagnetic interference.
- While this shielding helps, it is not sufficient to prevent interference when many cables are strung together in proximity to one another.
- The physical properties of fiber optic cables avoid most of these problems.

Cross Wired Cable Diagram:

Ethernet Crossover Cable Wiring

TX+	RX+
TX−	RX−
RX+	TX+
RX−	TX−

Straight Wire Cable Diagram:

Straight Through Wiring Guide
568-B