

CO - 2

COURSE NAME : SYSTEM DESIGN AND INTRODUCTION TO CLOUD

COURSE CODE : 23AD2103A

TOPICS : PHYSICAL LAYER –INTRODUCTION TO GUIDED MEDIA- TWISTED PAIR CABLE, COAXIAL CABLE AND FIBER OPTIC CABLE

SESSION DESCRIPTION

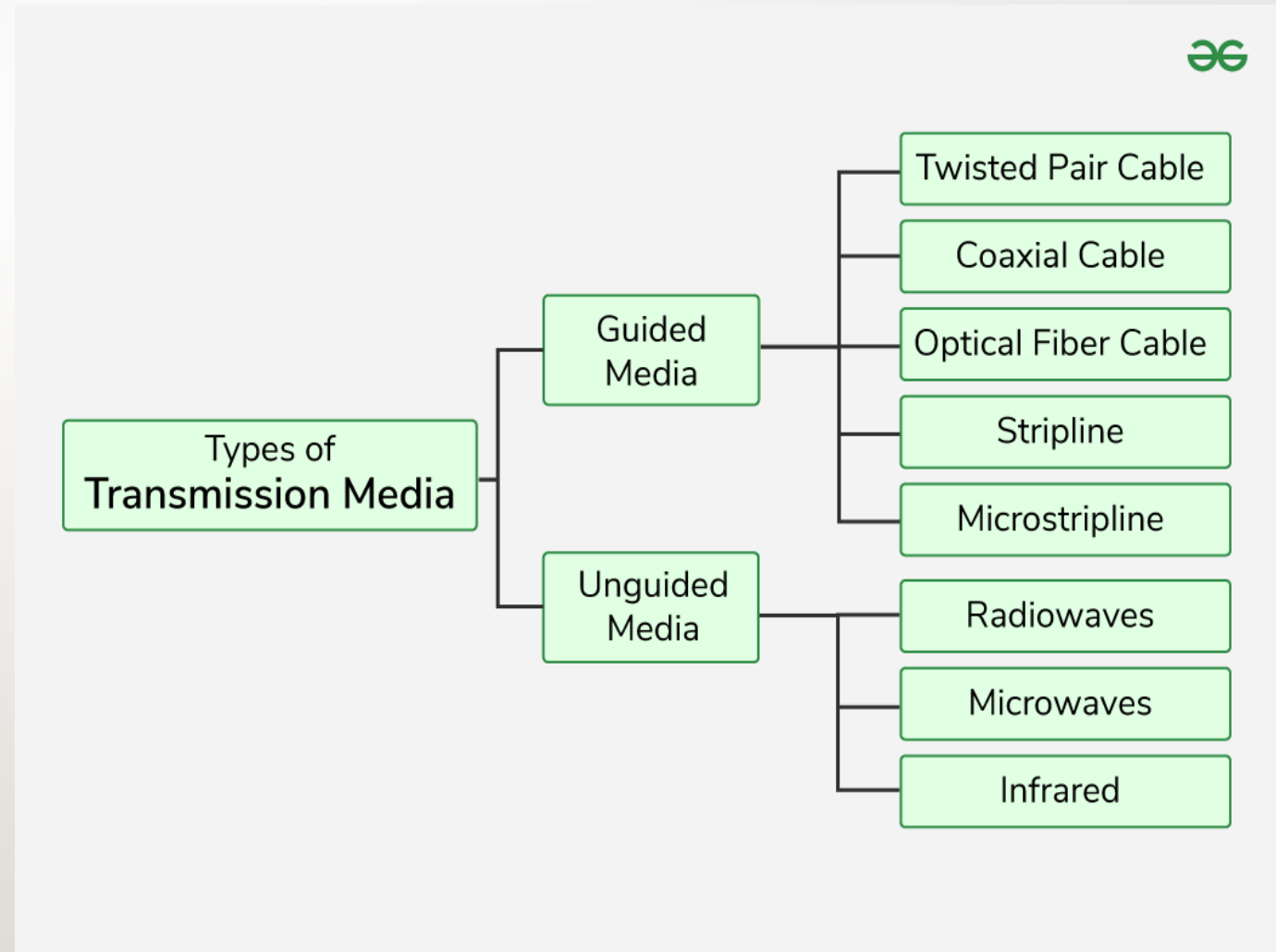
- Physical Layer –Introduction to Guided Media- Twisted pair cable, Coaxial cable and Fiber optic cable

PHYSICAL LAYER

- Transmission media refer to the physical pathways through which data is transmitted from one device to another within a network.
- These pathways can be wired or wireless. The choice of medium depends on factors like distance, speed, and interference.

WHAT IS TRANSMISSION MEDIA?

- A transmission medium is a physical path between the transmitter and the receiver i.e. it is the channel through which data is sent from one place to another. Transmission Media is broadly classified into the following types:



GUIDED MEDIA

- Guided Media is also referred to as Wired or Bounded transmission media. Signals being transmitted are directed and confined in a narrow pathway by using physical links.
- **Features:**
- High Speed
- Secure
- Used for comparatively shorter distances
- **There are 3 major types of Guided Media:**
- Twisted Pair Cable
- Coaxial Cable
- Optical Fiber Cable

TWISTED PAIR CABLE

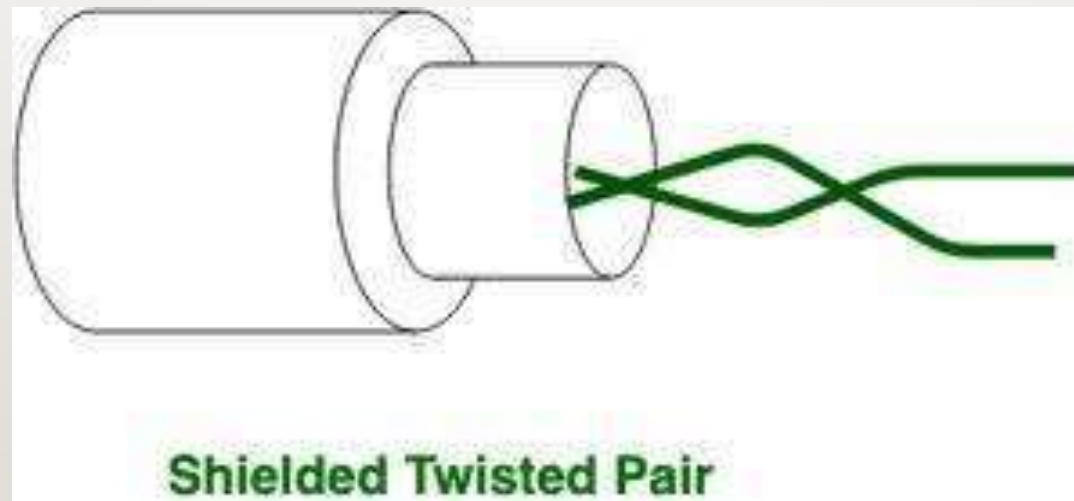
- It consists of 2 separately insulated conductor wires wound about each other. Generally, several such pairs are bundled together in a protective sheath. They are the most widely used Transmission Media. Twisted Pair is of two types:
- **Unshielded Twisted Pair (UTP):** UTP consists of two insulated copper wires twisted around one another. This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. It is used for telephonic applications.



- **Advantages of Unshielded Twisted Pair**
- Least expensive
- Easy to install
- High-speed capacity
- **Disadvantages of Unshielded Twisted Pair**
- Susceptible to external interference
- Lower capacity and performance in comparison to STP
- Short distance transmission due to attenuation

TWISTED PAIR CABLE

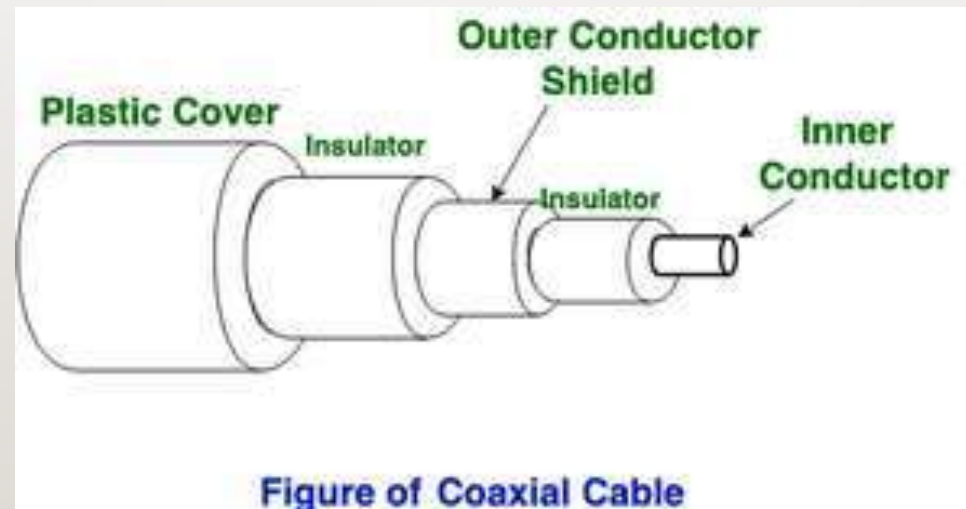
- **Shielded Twisted Pair (STP):** This type of cable consists of a special jacket (a copper braid covering or a foil shield) to block external interference. It is used in fast-data-rate Ethernet and in voice and data channels of telephone lines.



- **Advantages of Shielded Twisted Pair**
- Better performance at a higher data rate in comparison to UTP
- Eliminates crosstalk
- Comparatively faster
- **Disadvantages of Shielded Twisted Pair**
- Comparatively difficult to install and manufacture
- More expensive
- Bulky

COAXIAL CABLE

- It has an outer plastic covering containing an insulation layer made of PVC or Teflon and 2 parallel conductors each having a separate insulated protection cover. The coaxial cable transmits information in two modes: Baseband mode(dedicated cable bandwidth) and Broadband mode(cable bandwidth is split into separate ranges). Cable TVs and analog television networks widely use Coaxial cables.



- **Advantages of Coaxial Cable**

- Coaxial cables support high bandwidth.
- It is easy to install coaxial cables.
- Coaxial cables have better cut-through resistance so they are more reliable and durable.
- Less affected by noise or cross-talk or electromagnetic inference.
- Coaxial cables support multiple channels

- **Disadvantages of Coaxial Cable**

- Coaxial cables are expensive.
- The coaxial cable must be grounded in order to prevent any crosstalk.
- As a Coaxial cable has multiple layers it is very bulky.
- There is a chance of breaking the coaxial cable and attaching a “t-joint” by hackers, this compromises the security of the data.

OPTICAL FIBER CABLE

- Optical Fibre Cable uses the concept of refraction of light through a core made up of glass or plastic. The core is surrounded by a less dense glass or plastic covering called the cladding.
- It is used for the transmission of large volumes of data. The cable can be unidirectional or bidirectional. The WDM (Wavelength Division Multiplexer) supports two modes, namely unidirectional and bidirectional mode.

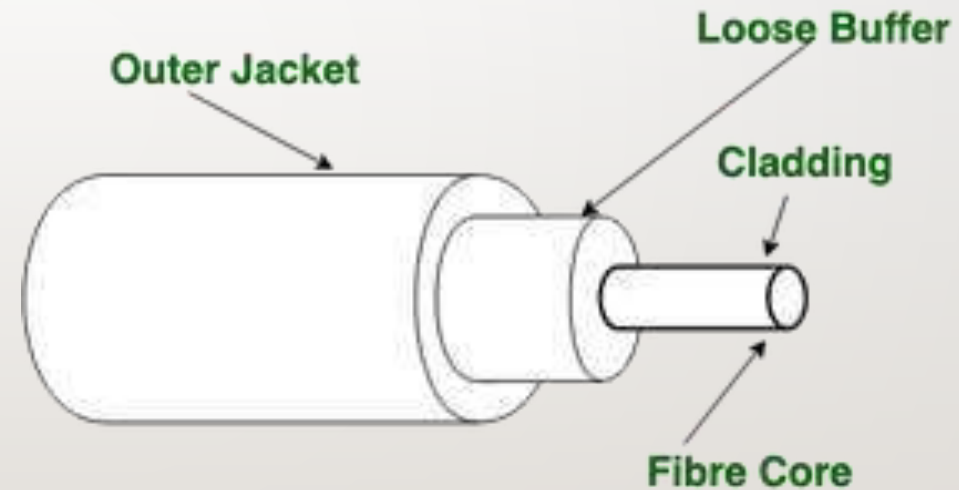


Figure of Optical Fibre Cable

- **Advantages of Optical Fibre Cable**
- Increased capacity and bandwidth
- Lightweight
- Less signal attenuation
- Immunity to electromagnetic interference
- Resistance to corrosive materials
- **Disadvantages of Optical Fibre Cable**
- Difficult to install and maintain
- High cost
- Fragile

APPLICATIONS OF OPTICAL FIBRE CABLE

- **Medical Purpose:** Used in several types of medical instruments.
- **Defence Purpose:** Used in transmission of data in aerospace.
- **For Communication:** This is largely used in formation of internet cables.
- **Industrial Purpose:** Used for lighting purposes and safety measures in designing the interior and exterior of automobiles.

THANK YOU



Team – System Design & Introduction to Cloud