

Implant Training in Telecom Technologies

Submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in **ELECTRONICS AND COMMUNICATION ENGINEERING**.

By

SHAIK JAVEED SULTAN
39130423



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING**

**SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY) Accredited with Grade "A" by
NAAC JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI -
600 119**

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javeed sultan

Certificate Number

RHYTMNB1742-2021-7742012

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Bharat Sanchar Nigam Limited
(A Govt. of India Enterprise)
Regional Telecom Training Centre



Gachibowli, Hyderabad - 500 032

Phone: 040-23000172 / 233

Web site: www.rttchyd.bsnl.co.in

CERTIFICATE

This is to certify

SHAIK.JAVEED SULTAN

has completed successfully the following course conducted by
Bharat Sanchar Nigam Limited

Name of the course : ONLINE INTERNSHIP TRAINING-ECE-2Weeks

Commencing Date : 02-08-21

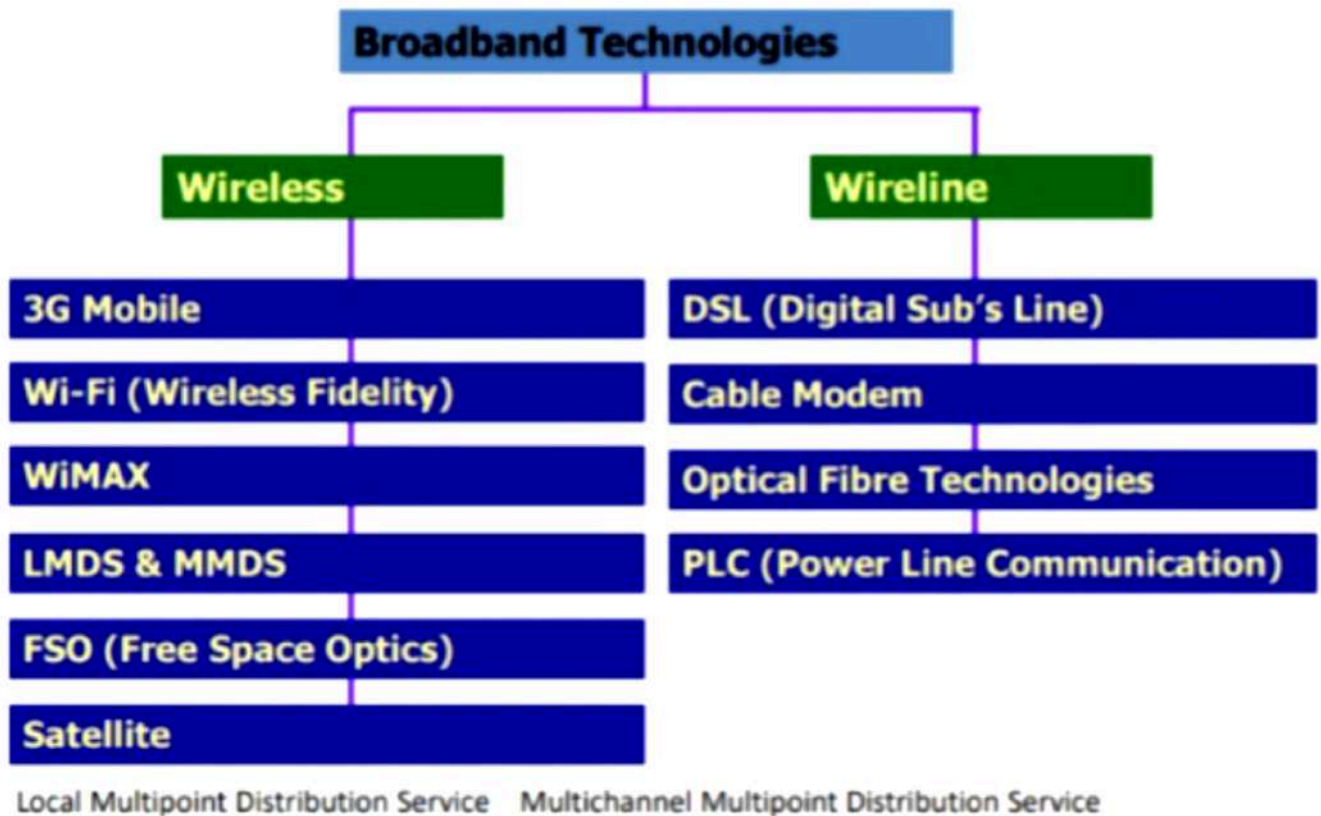
Completion Date : 13-08-21

(SATYANARAYANA V V V)
DEPUTY GENERAL MANAGER (DGM)

Dated : 13-08-21

Course Code : RHYTMNB1742 Course Schedule Code : RHYTMNB1742-2021-7742
Registered & Corporate Office: Bharat Sanchar Bhavan, H.C. Mathur Lane, Janpath, New Delhi-110 001

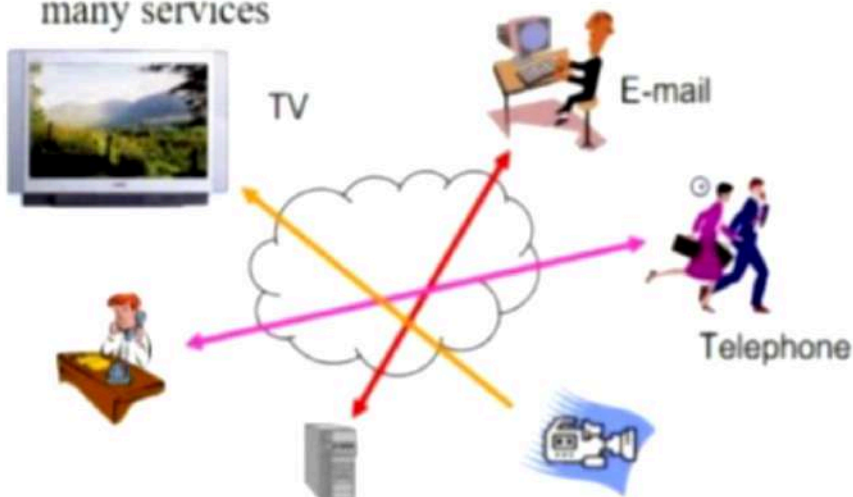
BROADBAND ACCESS TECHNOLOGIES



Overview of Digital Transmission Technologies

Digital Transmission Networks

- Digital transmission enables networks to support many services



A Transmission System



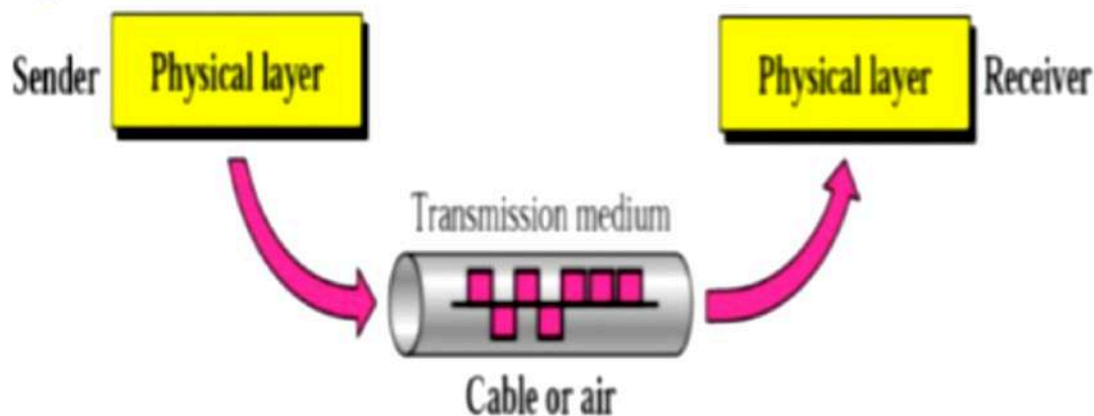
Transmitter

- Converts information into *signal* suitable for transmission
- Injects energy into communications medium or channel
 - Telephone converts voice into electric current
 - Modem converts bits into tones

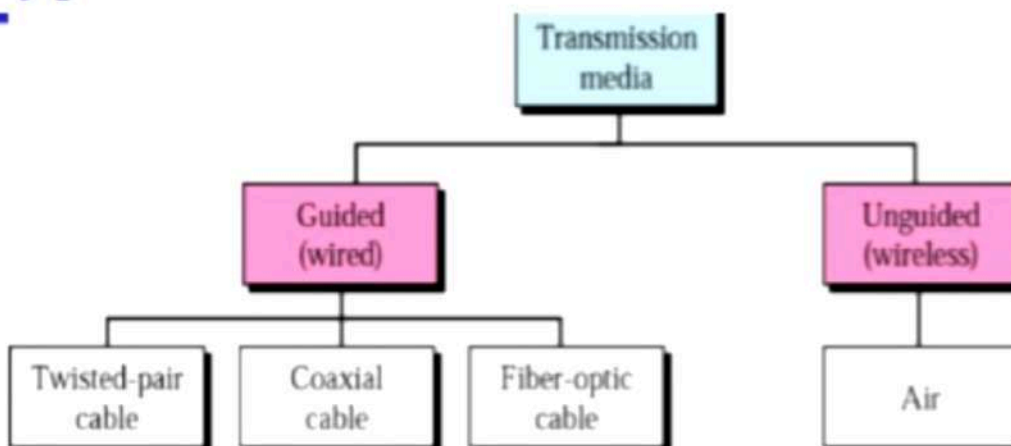
Receiver

- Receives energy from medium
- Converts received signal into form suitable for delivery to user
 - Telephone converts current into voice
 - Modem converts tones into bits

Transmission media and Physical Layer



Types of Transmission Media



Guided Media

Twisted-Pair Cable

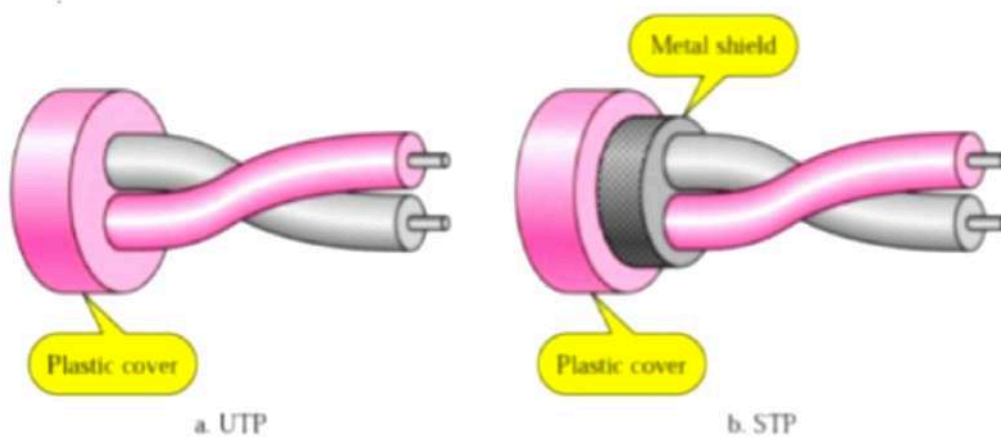
Coaxial Cable

Fiber-Optic Cable

Twisted-Pair



Twisted-Pair



PIJF Cable



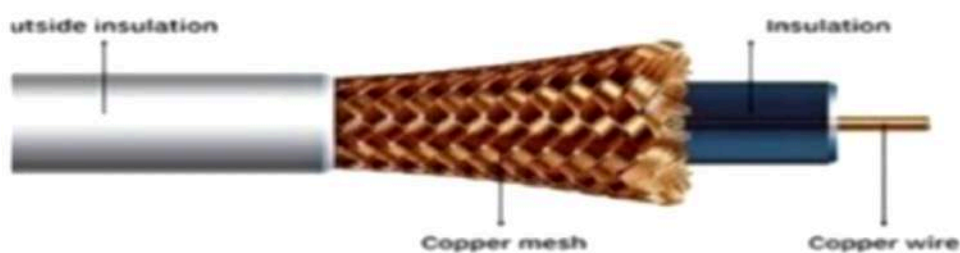
PIJF cables

5 pair
10 pair
20 pair
50 pair
100 pair
200 pair
400 pair etc



Coaxial Cable

Coaxial cable



Internet of Things *(IoT)*

Evolution of IOT – Embedded Aspect

- Desktop Computing
- Pervasive/Ubiquitous Computing
- Embedded systems with Automatic control
- Wireless Sensor Networks
- M2M
- IOT



Desktop Computing

A personal computer designed for regular use at a single location on or near a desk or table due to its size and power requirements

Pervasive Computing

Also called ubiquitous computing, is embedding computational capability (generally in the form of microprocessors) into everyday objects to make them perform useful tasks in a way that minimizes the end user's need to interact.



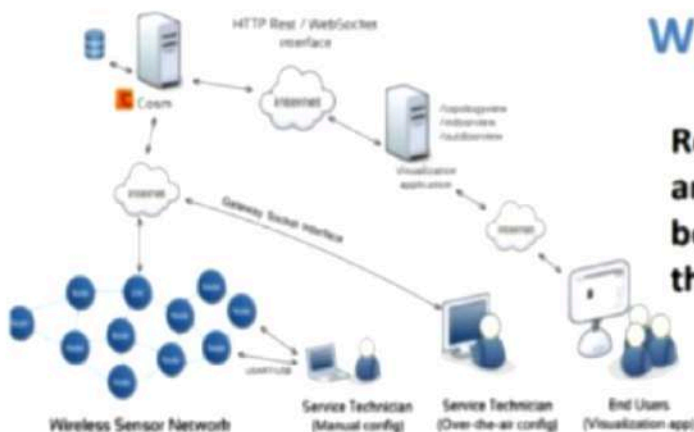
Embedded Systems

An embedded system is a programmed controlling and operating system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints



Wireless Sensor Networks

Refers to a group of spatially dispersed and dedicated sensors. sensor data can be transported cooperatively through the network to a main location



M2M



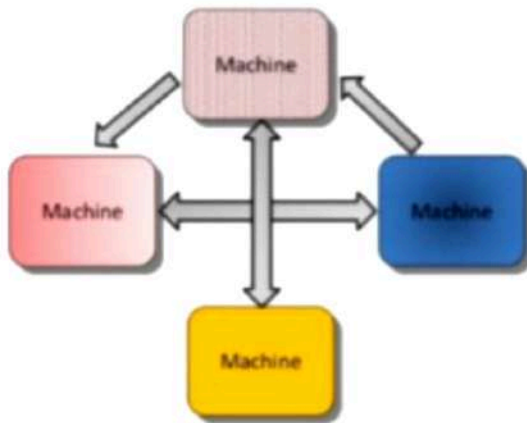
Machine-to-machine, or M2M, is a broad label that can be used to describe any technology that enables networked devices to exchange information and perform actions without the manual assistance of humans.

What is the Internet of Things?

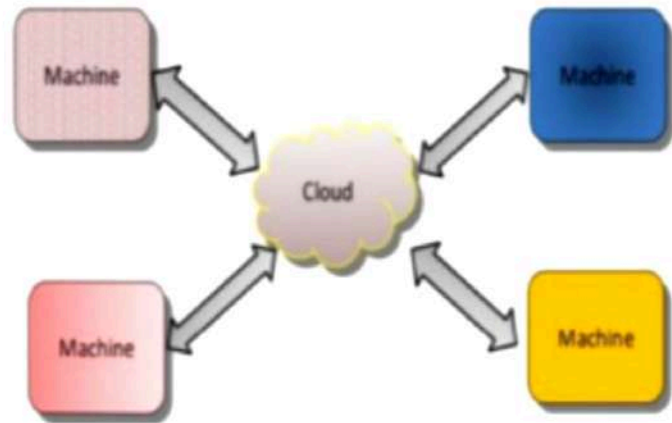


- Internet connects all people, so it is called “the Internet of People”
- IoT connects all things, so it is called “the Internet of Things”

M2M



IoT



Internet of Things - ITU Definition

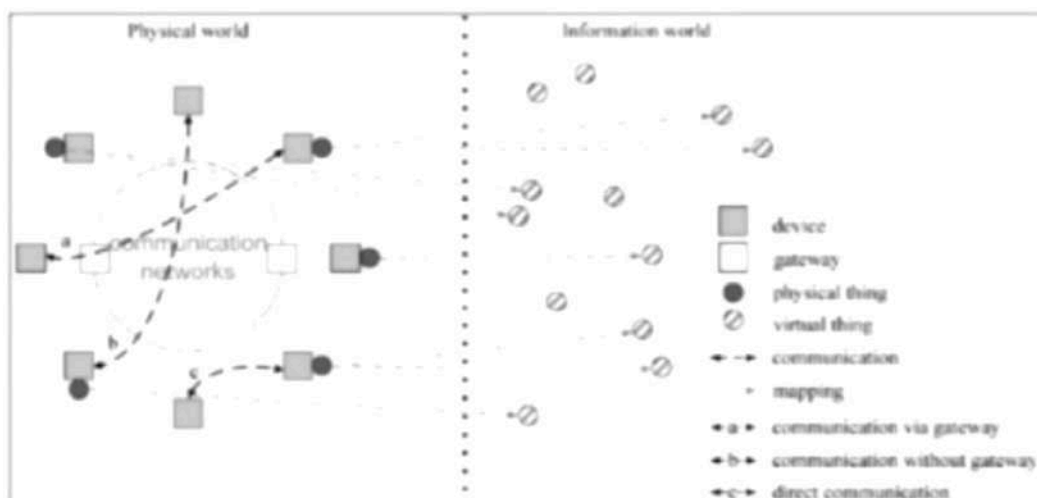
Physical things

Exist in the physical world and are capable of being sensed, actuated and connected.
Examples: industrial robots, goods and electrical equipment.

Virtual things

Exist in the information world and are capable of being stored, processed and accessed.

Examples: Multimedia content, application software.



What's the Internet of Things

■ Definition

(3) The term "Internet of Things" has come to describe a number of technologies and research disciplines that enable the Internet to reach out into the real world of physical objects.

-----IoT 2008

(4) "Things having identities and virtual personalities operating in smart spaces using intelligent interfaces to connect and communicate within social, environmental, and user contexts".

-----IoT in 2020

Internet of Things – Time Line



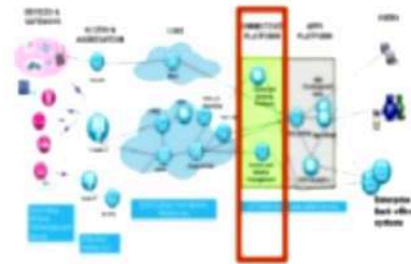
Kevin Ashton – First Scholar to coin and use the term "Internet of Things"

• History

- 1997, "The Internet of Things" is the seventh in the series of ITU internet Reports originally launched in 1997 under the title "Challenges to the Network".
- 1999, Auto-ID Center founded in MIT
- 2003, EPC Global founded in MIT
- 2005, Four important technologies of the internet of things was proposed in WSIS conference.
- 2008, First international conference of internet of things: The IOT 2008 was held at Zurich.

IoT platforms

- 1) PTC (U.S.),
- 2) Amazon Web Services (U.S.),
- 3) Microsoft Corporation (U.S.),
- 4) Google (U.S.),
- 5) Cisco Systems, Inc. (U.S.),
- 6) SAP SE (Germany),
- 7) General Electric (U.S.),
- 8) AT&T (U.S.),
- 9) Huawei Technologies Co. Ltd. (U.S.),
- 10) IBM (U.S.), Wipro (U.S.),
- 11) Nokia (U.S., Finland) and
- 12) HPE (U.S.) among others.



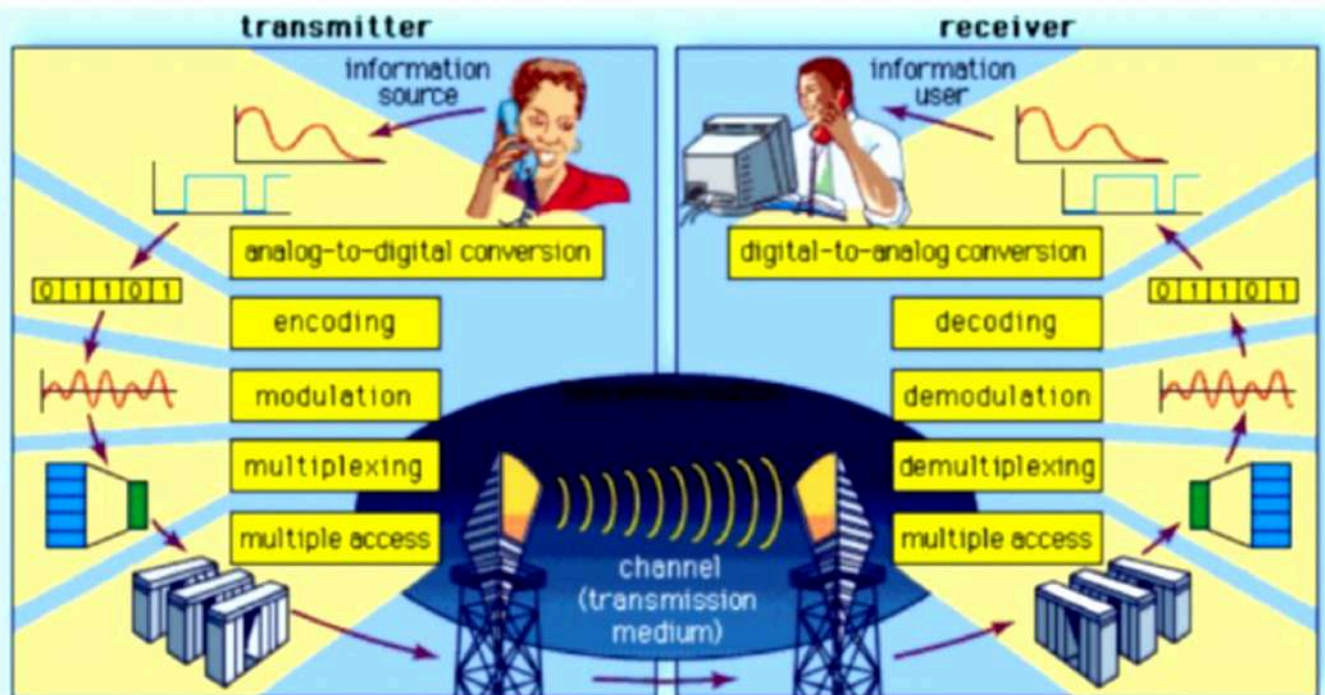
Overview of Optical Fiber Communication

- Introduction to Telecom network.
- Transmission Fundamentals
- Limitations of PIJF cable.
- Internet bandwidth growth.

- History of OF cable.
- Advantages of OF cable.
- Applications of OF cable.
- Basic working principle.
- Transmission sequence of OF cable.
- Parameters of OF cable.
- Classifications of OF cable.
- Fiber Geometry.

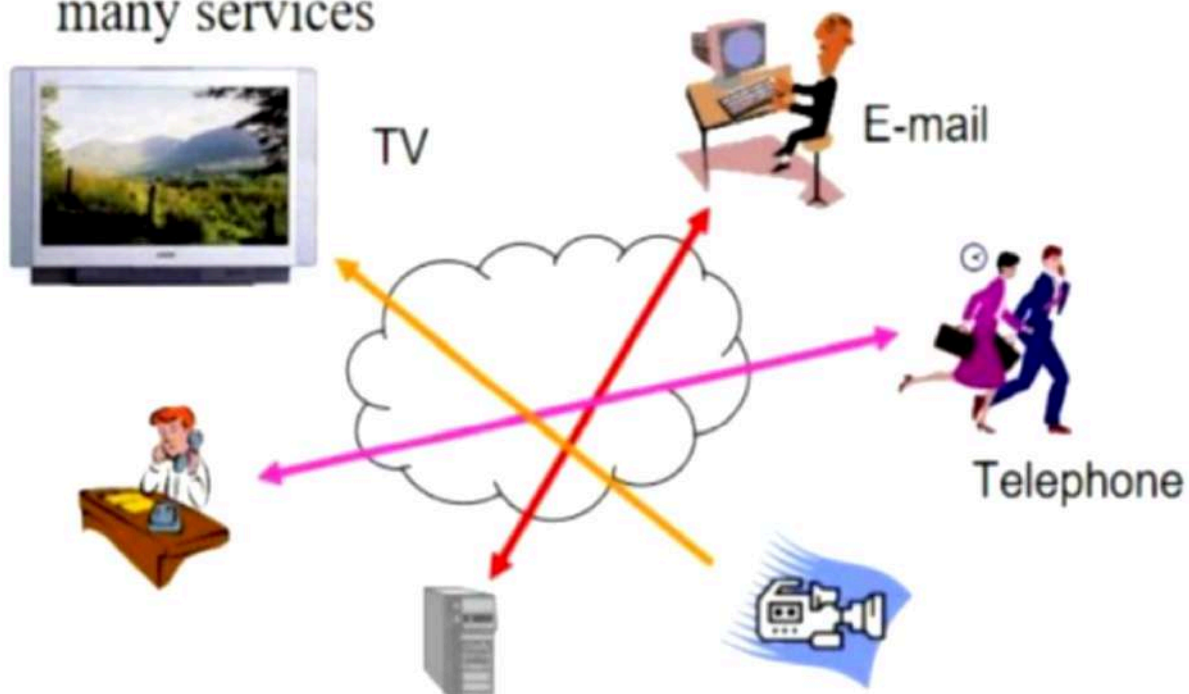
Introduction to Telecom network

- What is communication?
- Transfer of information from one node to another node.
- What is in between these two nodes?
- Transmission Medium (Channels).
- What are the different types of Transmission mediums?
- Wire less and wired mediums.



Digital Transmission Networks

- Digital transmission enables networks to support many services



Mobile Communication- 3G, 4G & 5G overview

Evolution of mobile Technologies



1G

1ST GENERATION *wireless network*

- Basic voice service
- Analog-based protocols



2G

2ND GENERATION *wireless network*

- Designed for voice
- Improved coverage and capacity
- First digital standards (GSM, CDMA)



3G

3RD GENERATION *wireless network*

- Designed for voice with some data consideration (multimedia, text, internet)
- First mobile broadband



4G

4TH GENERATION *wireless network*

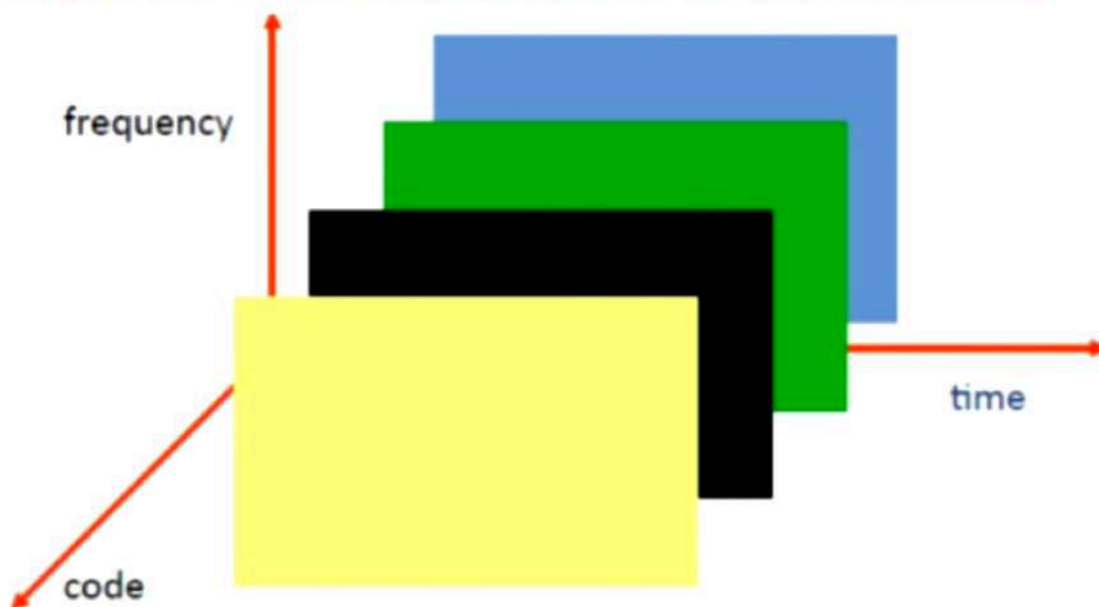
- Designed primarily for data
- IP-based protocols (LTE)
- True mobile broadband



WHY MULTIPLE ACCESS ?

- The base stations need to serve many mobile terminals at the same time (both downlink and uplink)
- All mobiles in the cell need to transmit to the base station
- Interference among different senders and receivers
- So we need multiple access scheme

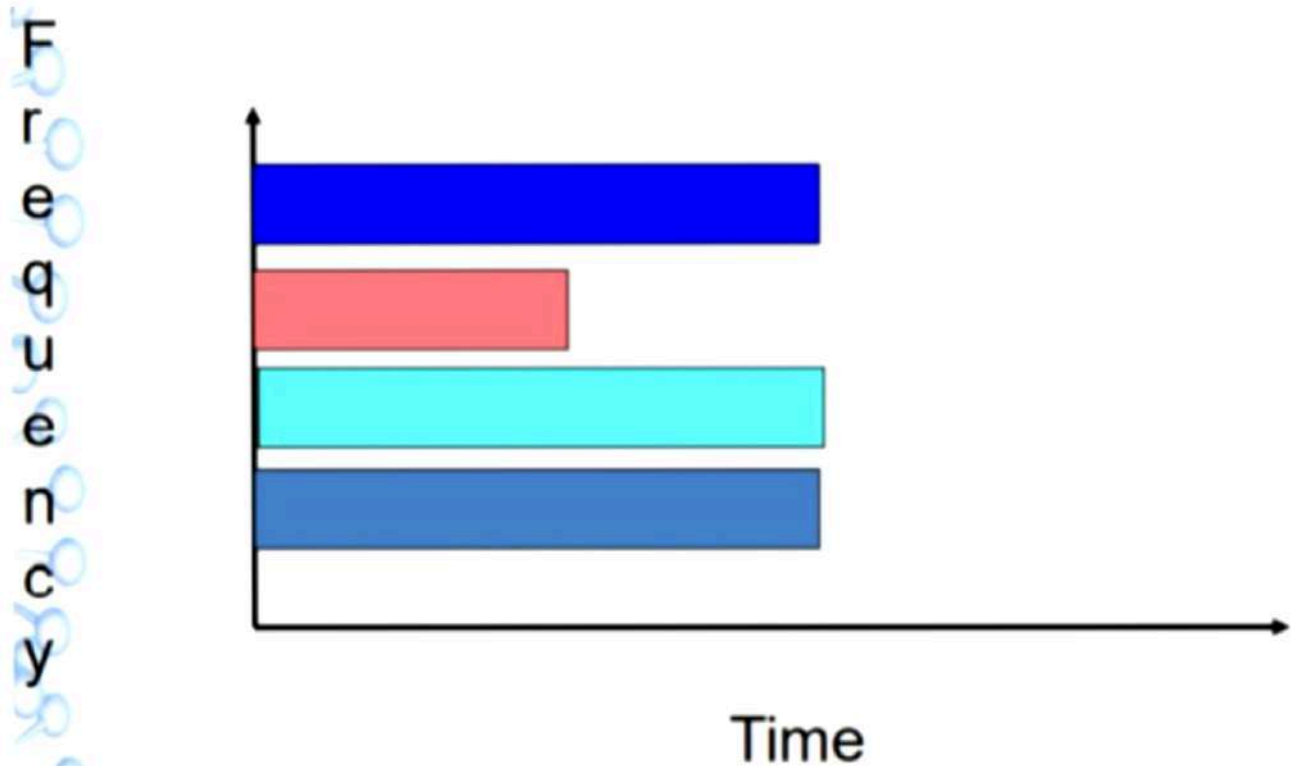
MULTIPLE ACCESS SCHEMES



3 orthogonal Schemes:

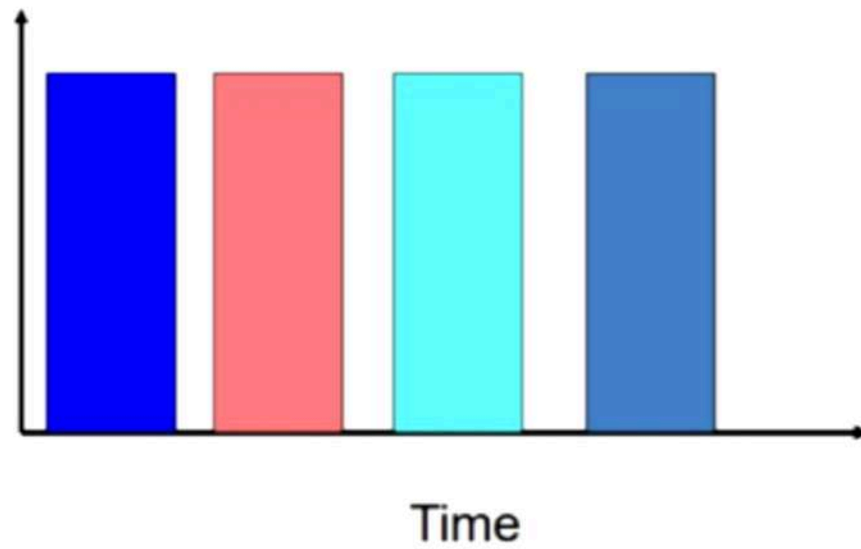
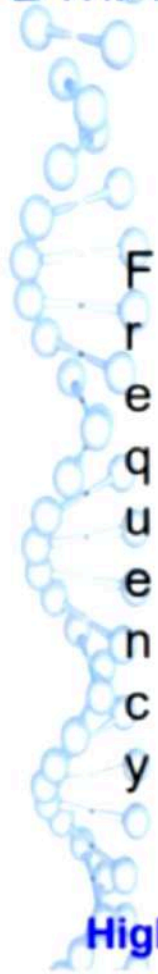
- Frequency Division Multiple Access (FDMA)
- Time Division Multiple Access (TDMA)
- Code Division Multiple Access (CDMA)

FDMA (Frequency Div. Multiple Access)



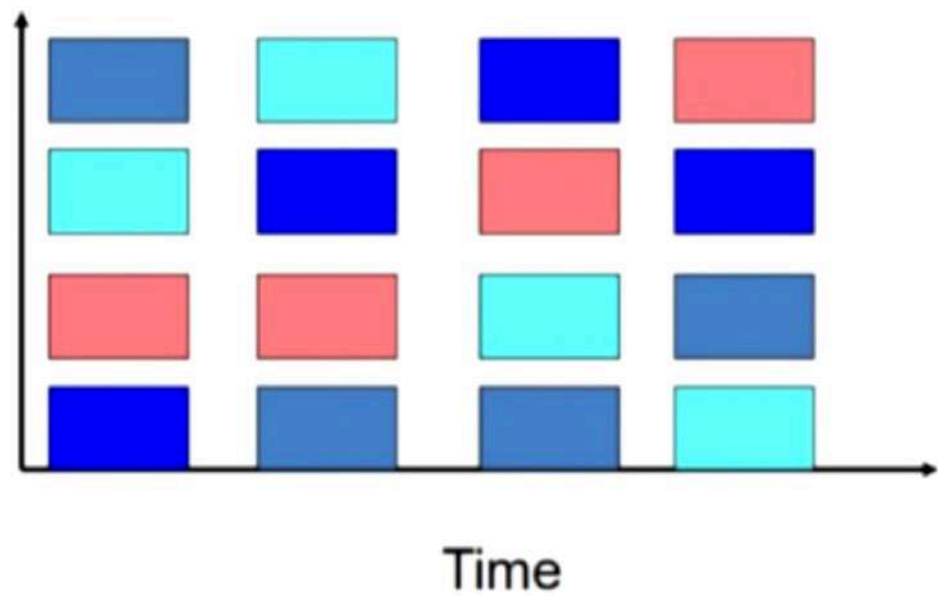
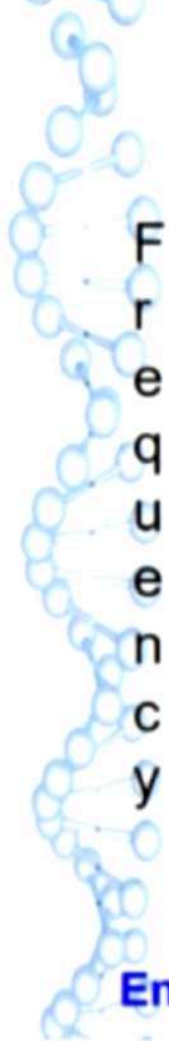
Limited Bandwidth; But always available to user.

TDMA (Time Division Multiple Access)



Higher Bandwidth: But on time domain, shared

CDMA (Code Division Multiple Access)



Entire bandwidth available to all users all the time

THANK YOU