

Tishk International University (TIU)

Mechatronics Engineering Department

Communication Systems ME 316

Lecture 1 (Part 1) : 12-10-2019



# Introduction

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# Outlines

- **Course Description**
- **Course Objectives**
- **Course Teaching and Learning Activities**
- **Course Assessment Methods**
- **The Responsibility of Student**

# Communication Systems

## **Course Description:**

- **This course designed to cover and provide a beneficial understanding of the following topics :**
  - Introduction to Communication systems.
  - Elements of Communication systems .
  - Types of communication system and different applications.
  - Amplitude Modulation (AM).
  - Frequency modulation (FM).
  - Phase modulation (PM).
  - Noise Characterization.
  - Pulse modulation .

# Communication Systems

## Course Objectives:

- Introduce the basic types and principles of communication systems.
- To understand the theory and applications of communication systems.
- To provide students a knowledge about analog communication system which includes (AM, FM, PM, PCM ) techniques.
- To improve the ability of students to understand the analysis of modulation , demodulation , frequency bandwidth  
and wave propagation .
- To know the main properties and effect of noise on communication signals and systems.

# Communication Systems

## Course Teaching and Learning Activities

- The course divided into :

### **1. Theoretical part :**

- 3 Hours / week.
- The class on Saturday 12:30 – 3:30 PM , Room No.213.
- Activities : Home work and Class activities ( Group presentation, Assignment , Quizzes , MCQ,...etc.).

### **2. Practical part :**

- 3 hours / week .
- The lab on Wednesday 3.30 – 6.30 PM , Room No.250A.
- Activities : Report and participate.

- **Note** : Attendance is required for both (**Theoretical and Practical**) parts.

# Communication Systems

Course Assessment Methods	
Assessment Methods	Percentage %
Attendance	5%
Exam (Quiz)	5%
Home work (Activities)	5%
Class (Activities)	5%
Laboratory	10%
Midterm-Exam	20%
Practical exam (Lab)	10%
Final Exam	40%
Total	100%

# Communication Systems

## **The Responsibility of Student**

- The course in English Language.
- The student have to attend all the classes and labs on time and participate actively inside the class.
- Each student required to bring the necessary stuff and materials such as stationary , scientific calculator, notebook ..etc.
- Student have to submit the assignment, home work and lab report on time.
- The student have to attend and complete all the exams (Final exam , Midterm exam , Lab exam ) on time .
- The student not allowed to use the mobile inside the class.

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# Introduction to Communication Systems

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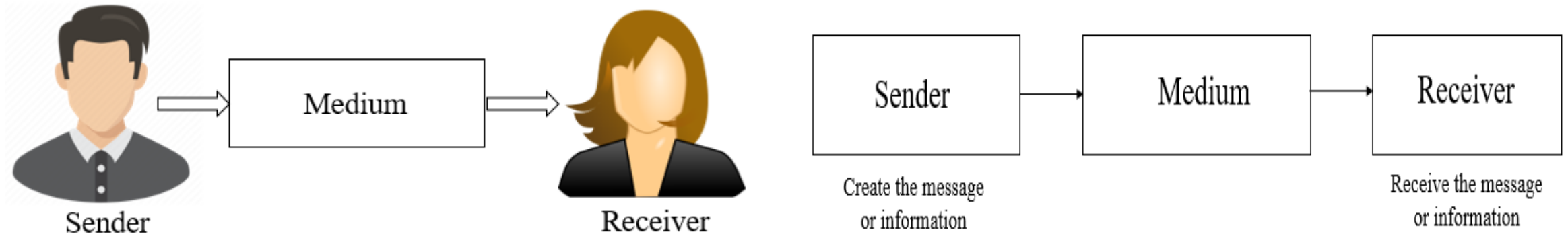


# Outlines

- **Definition of Communication Systems**
- **Evolution of Communications Systems**
- **History of Communication System**
- **Types of Transmission Direction**

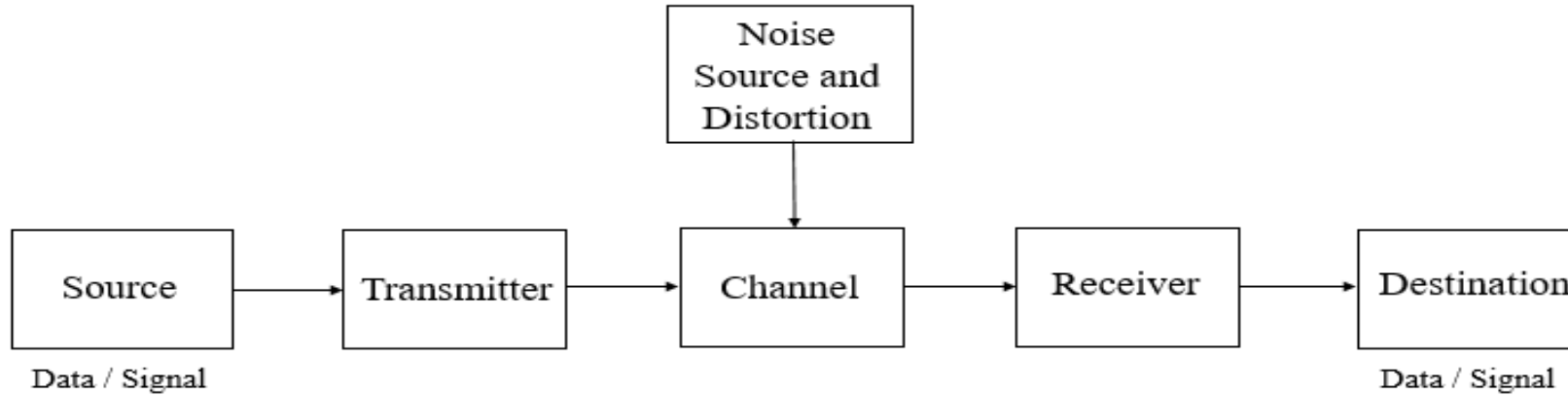
# Definition of Communication Systems

- **Communication** means the process of transfer information between two places/points the first point called **Sender** which creating the message/information and the second point called the **Receiver** which is get/receive the message/information through the carrier Medium.



- **Communication or Telecommunication systems** designed on the principle of transmit the data/signal from the source/generator to the receiver then to target /destination along different transmission channels, during the communication process there is a noise source

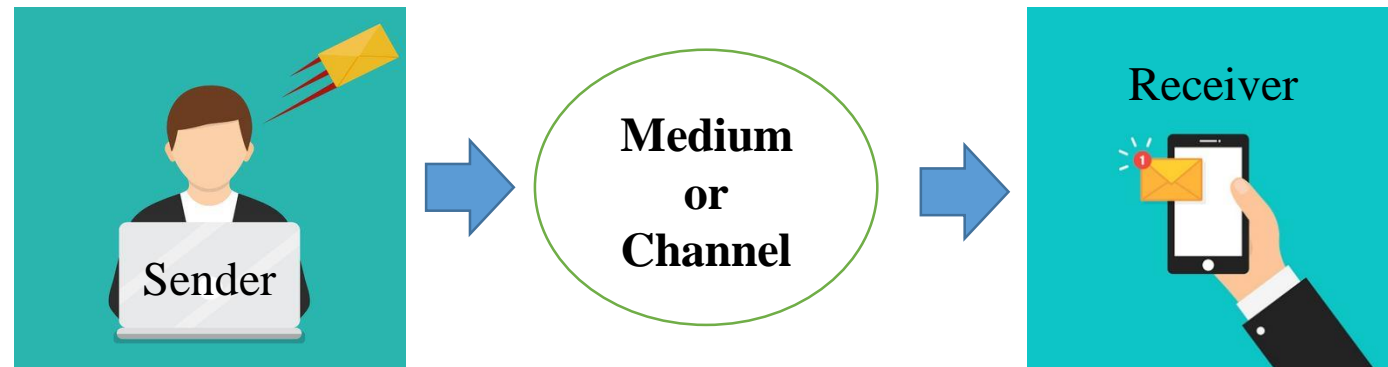
# Definition of Communication Systems



- **The Communication systems** describe the concept of the communication between many hardware and software tools and devices at one time/location to another time/location.

- **Examples** of the communication:

- Telephone
- Radio
- TV
- Mobile
- Website and Email
- Chat
- Satellite



# Evolution of Communications Systems

Examples of communication old methods:



Cave drawings



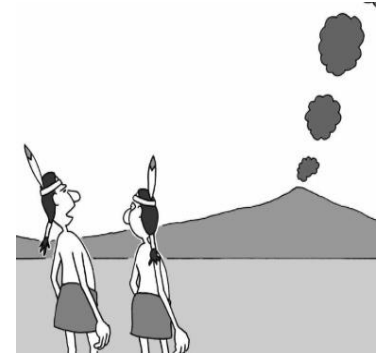
Message on stone



Drams



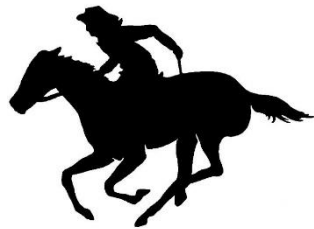
Fire Signal



Smoke Signal



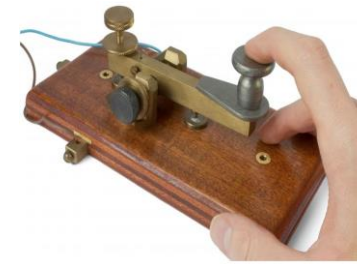
Pigeons



Horse



Ship's flag



Telegraphy



Post office

# Evolution of Communications Systems

Examples of communication new and modern methods:



Classic Telephone



Telephone



Fax



Radio



Mobile Telephone



Video Call



3D Hologram



Telepathy

# Evolution of Communications Systems

New & Modern Methods	Old Methods
Faster in communications	Slow in communications
Easier to use and relatively very cheap	Difficult and relatively expensive
Ability to send a huge amount of information	Limited amount of information can be send
All methods can be use at any time of the day	Some methods can be use at specific time of the day
The information are highly secure and difficult to “tap into”	The Information is not secure

# History of Communication System

Year	Event
1837	Morse invented <b>Telegraph</b>
1858	<b>1<sup>st</sup> Telegraphy cable</b> (Canada – Ireland) across Atlantic
1876	Alexander Bell invented of <b>Telephone</b>
1897	Marconi invented <b>Wireless Telegraphy</b>
1906	<b>Radio Communication System</b> was invented
1920	<b>AM broadcasting</b> was established
1923	<b>Television</b> was invented
1933	<b>FM radio</b> was invented by inventor Edwin H. Armstrong
1938	<b>Radar and Microwave System</b> was invented for <b>WW II</b>
1953	<b>Color Television System</b> was invented
1960	<b>Laser</b> was invented

# History of Communication System

Year	Event
1962	Satellite Communication
1970	Corning Glass invented Optical Fiber
1972	Cellular Telephone was introduced
1973	The world's first Mobile Phone Call was made
1975	Digital Telephone was introduced
1985	FAX - Called telecopying or telefax
1988	Installation of Fiber Optic cable across Pacific and Atlantic
1990	World Wide Web (www.) and Digital Communication
1998	Digital Television
1999	FTTH was introduced
2003	Internet Telephony



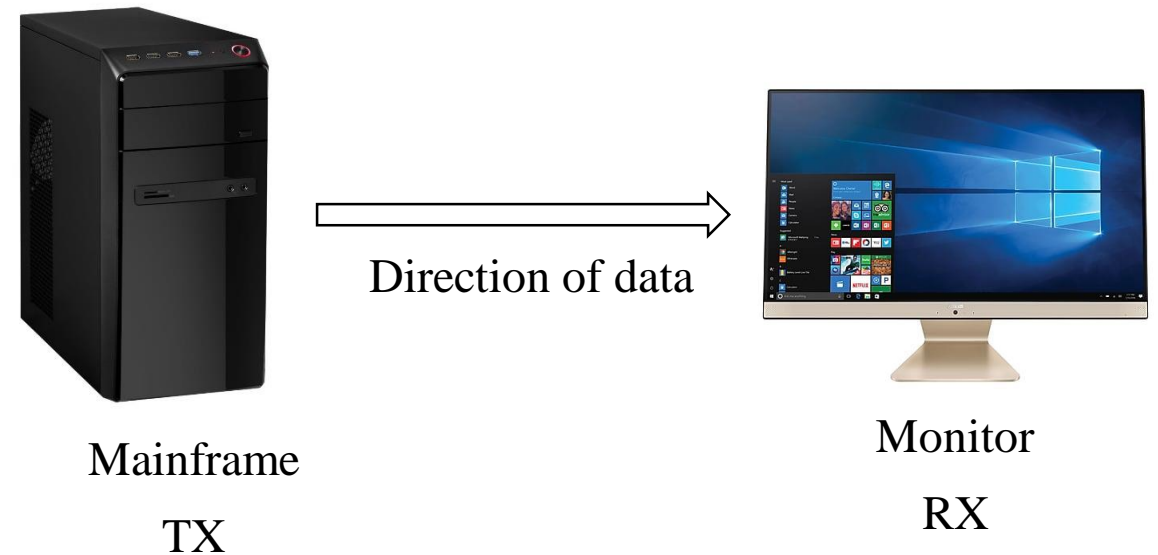
# Types of Transmission Direction

- **Communications System** include **Three main** modes / ways of transmission direction:

1. **Simplex** : The simplex communication based on transmission information/data in **one direction** either send only or receive only , there is no process to transmitting the information /data back to the sender .

- **Examples :**

- TV Broadcast
- Loudspeaker
- Radio Station



# Types of Transmission Direction

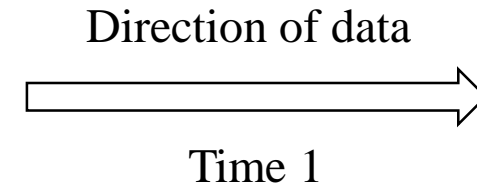
**2. Half-duplex :** in this mode each **station** can both **transmit and receive** the data/information ,but not at the same time when one device is sending the other can only receive and vice versa.

- **Examples :**

- Citizens band (CB) radio
- Walkie-Talkie



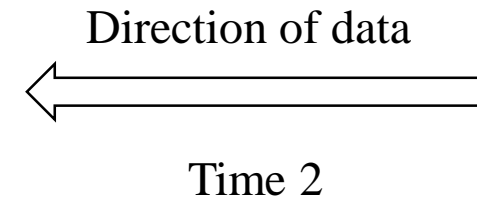
Workstation A



Workstation B



Workstation A



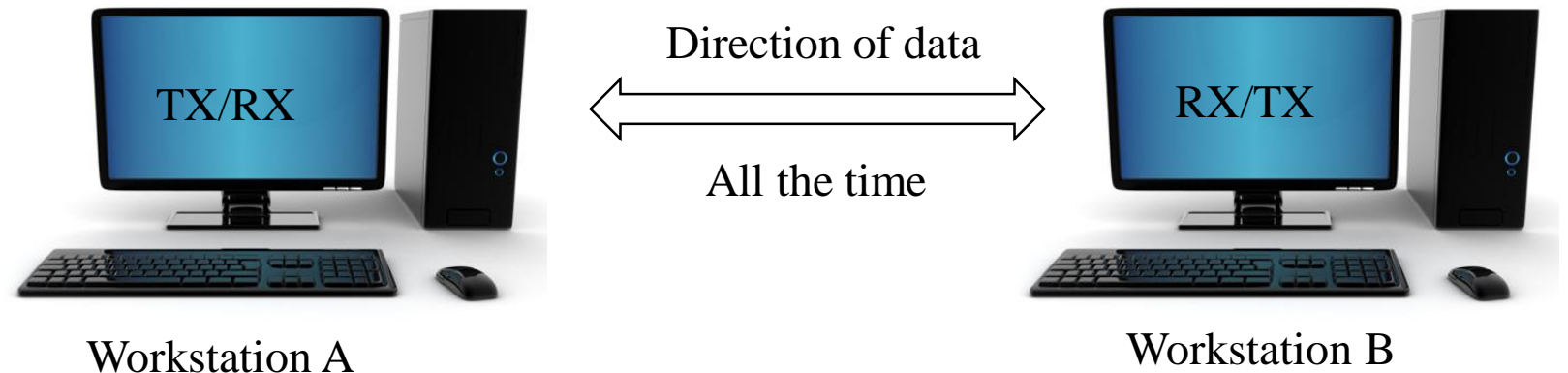
Workstation B

# Types of Transmission Direction

**3. Full-duplex :** this system can transmit the data/information together in **both directions** on transmission path ,both connected devices can transmit and receive the data at the same time , in full-duplex mode the two person on the telephone network, both can listen and speak at the same time .

- **Examples :**

- Telephone network



- Next lecture will cover the following topics :
- **Elements of Communication Systems**
- **Communication Systems and Signals**
- **Types of Communication System**
- **Noise and Distortion**