SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore-35

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++'
Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECB301-ANALOG AND DIGITAL COMMUNICATION

III YEAR/ V SEMESTER

UNIT 3 – DIGITAL COMMUNICATION
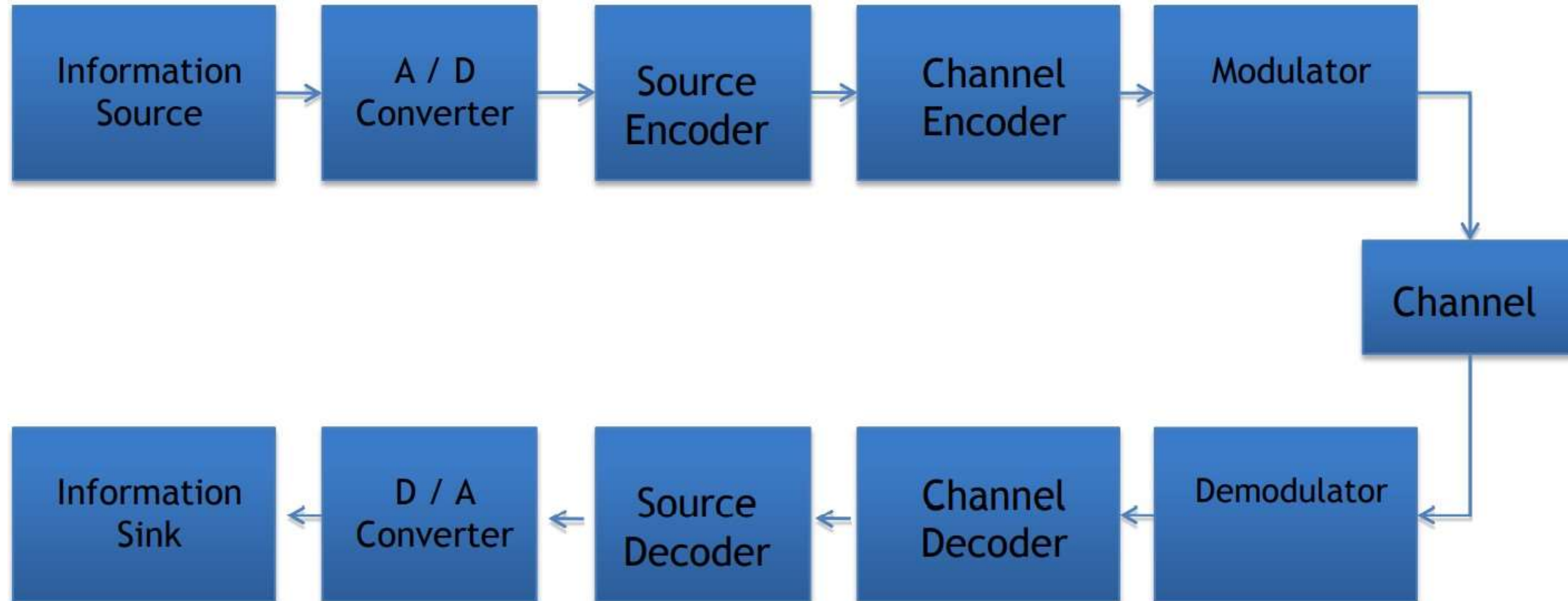
TOPIC – BLOCK DIAGRAM OF DIGITAL COMMUNICATION

BLOCK DIAGRAM OF COMMUNICATION SYSTEMS

Information Source	→	Transmitter	→	Channel	→	Receiver	→	Information Sink

Block Diagram of a typical communication system

BLOCK DIAGRAM OF DIGITAL COMMUNICATION

BLOCK DIAGRAM OF DIGITAL COMMUNICATION

- Information source
  - Analog Data: Microphone, speech signal, image, video etc...
  - Discrete (Digital) Data: keyboard, binary numbers, hex numbers, etc...
- Analog to Digital Converter (A/D)
  - Sampling:
    - Converting continuous time signal to a digital signal
  - Quantization:
    - Converting the amplitude of the analog signal to a digital value
  - Coding:
    - Assigning a binary code to each finite amplitude

- Source encoder
  - Represent the transmitted data more efficiently and remove redundant information
    - How? "write Vs. rite"
    - Speech signals frequency and human ear "20 kHz"
  - Two types of encoding:
  - Lossless data compression (encoding)
    - Data can be recovered without any missing information
  - Lossy data compression (encoding)
    - Smaller size of data
    - Data removed in encoding can not be recovered again

BLOCK DIAGRAM OF DIGITAL COMMUNICATION

- Channel encoder:
  - To control the noise and to detect and correct the errors that can occur in the transmitted data due the noise.

- Modulator:
  - Represent the data in a form to make it compatible with the channel
    - Carrier signal "high frequency signal"

- Demodulator:
  - Removes the carrier signal and reverse the process of the Modulator

BLOCK DIAGRAM OF DIGITAL COMMUNICATION

- Channel decoder:
  - Detects and corrects the errors in the signal gained from the channel

- Source decoder:
  - Decompresses the data into it's original format.

- Digital to Analog Converter:
  - Reverses the operation of the A/D
  - Needs techniques and knowledge about sampling, quantization, and coding methods.

- Information Sink
  - The User

WHY SHOULD WE USE DIGITAL COMMUNICATION ?

- Ease of regeneration
  - Pulses " 0 , 1"
  - Easy to use repeaters
- Noise immunity
  - Better noise handling when using repeaters that repeats the original signal
  - Easy to differentiate between the values "either 0 or 1"
- Ease of Transmission
  - Less errors
  - Faster !
  - Better productivity

WHY SHOULD WE USE DIGITAL COMMUNICATION ?

- Ease of multiplexing
  - Transmitting several signals simultaneously

- Use of modern technology
  - Less cost !

- Ease of encryption
  - Security and privacy guarantee
  - Handles most of the encryption techniques

DISADVANTAGES

- The major disadvantage of digital transmission is that it requires a greater transmission bandwidth or channel bandwidth to communicate the same information in digital format as compared to analog format.

- Another disadvantage of digital transmission is that digital detection requires system synchronization, whereas analog signals generally have no such requirement.

THANK YOU