



**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**



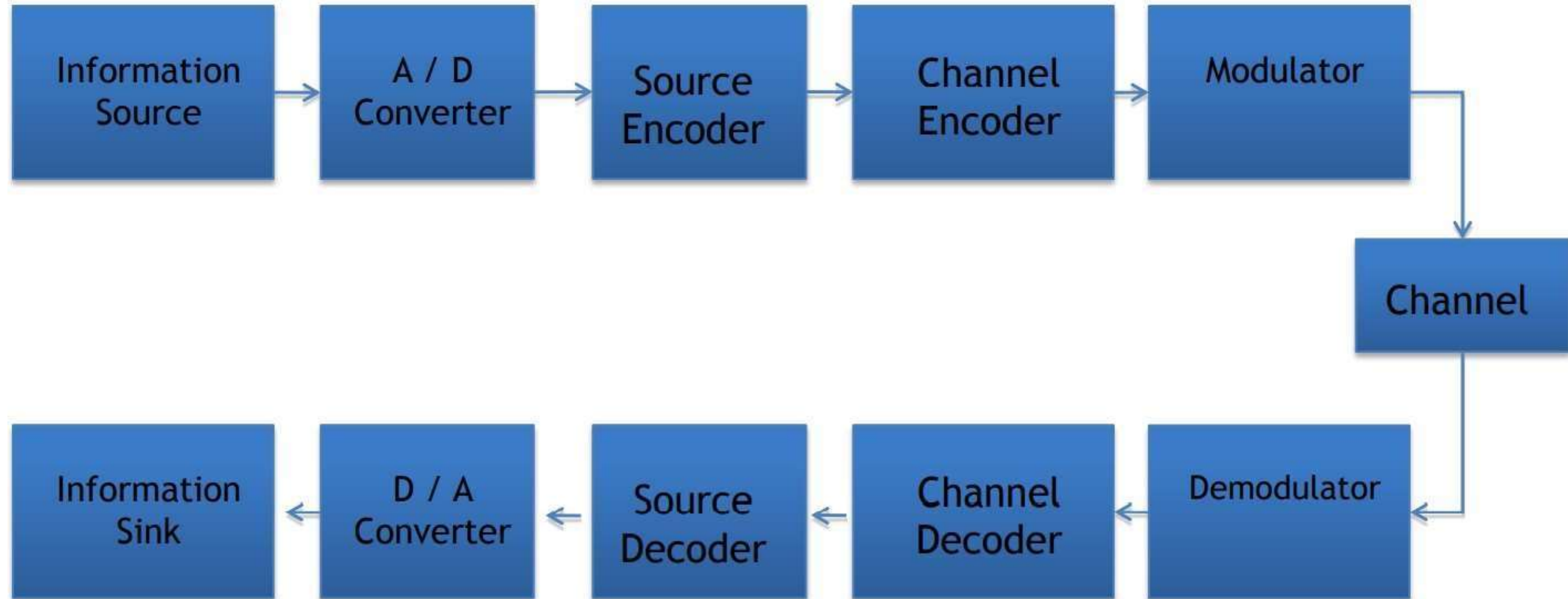
# BLOCK DIAGRAM OF COMMUNICATION SYSTEMS



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



# BLOCK DIAGRAM OF DIGITAL COMMUNICATION



- 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 its 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**