



**American International University- Bangladesh**  
**Department of Electrical and Electronic Engineering**  
**EEE 3215: Principles of Communication Laboratory**

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**Lab Report**

**Semester: Spring 2021-2022**

**Section: B**

**Group No: 3**

**Title:** Designing A Message Transmitting and Receiving System for Digital Communication System.

**Submitted to-**

**NOWSHIN ALAM**  
**Dept. Of EEE**  
**Faculty of Engineering**

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**Title:** Designing A Message Transmitting and Receiving System for Digital Communication System.

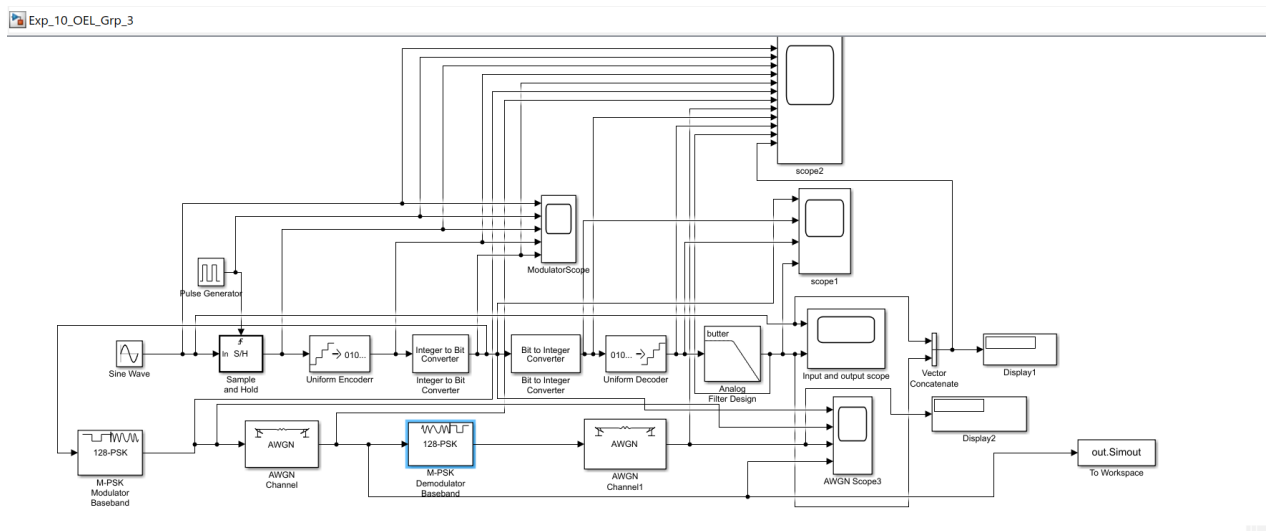
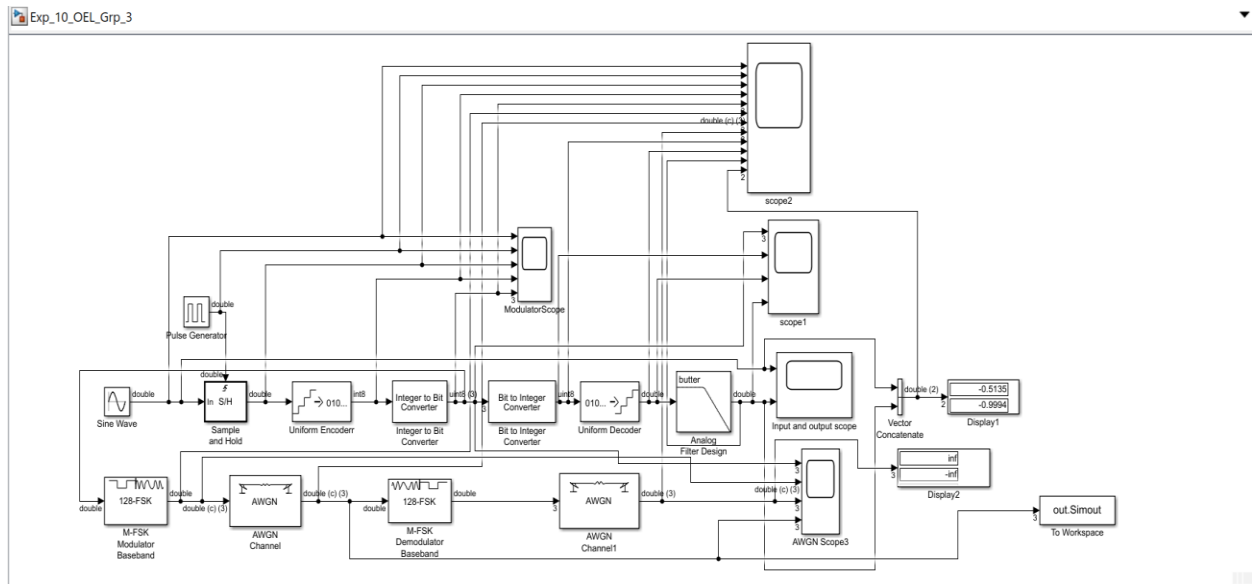
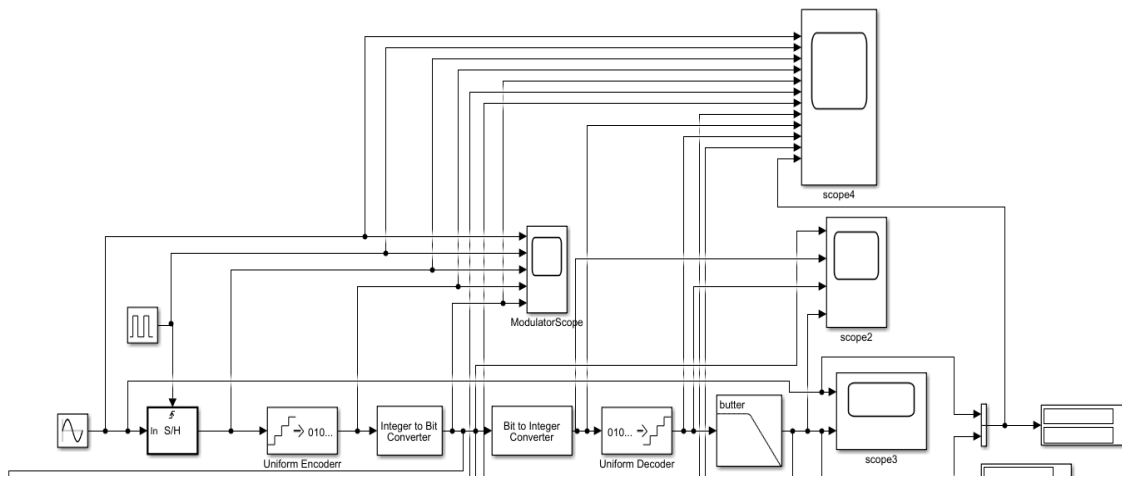
**Abstract:** The lab is about designing a message Transmitting and receiving system for a digital communication system and the objective of this experiment is to use previous knowledge of frequency, bandwidth, digital data, bit rate, sampling, and quantization, different analog and digital modulation and demodulation techniques to make a transmitting and receiving system for a digital communication system. So, in this lab, we designed a communication system using PCM which is mainly used in telephone line and mobile communication systems and PCM has 3 steps where we did sampling, quantizing, and encoding to fulfil this lab and we used a digital technique named PSK which conveys data by changing the phase of a constant frequency reference signal. It is used in different communication systems and after that for the receiving side we did DPCM and the opposite technique of PSK to convert digital to analog.

#### **Introduction:**

Message transmitting and receiving of digital communication is the exchange of information of two points. In an electronics point of view using the electronic gadget or devices the information can be exchange between two points which are far away from each other. So, this exchange of information could be wired or wireless. And the communication could be point to point or point to multi-point or in the network also. And many times, this communication could be even the broadcast also. Where from one station the information is broadcast. And one such example is the FM transmission. Where a reduced station broadcasts the information at a particular frequency and anyone can tune the receiver to the particular frequency or channel to receive the information. And in fact, using the gadgets we are sending and receiving the information every day. Like talking on a smart phone or sending an email to someone and even watching the television are the example of the different communication system. So, the transmission and reception process of information or message are introduced here using suitable block and block diagram.

Simulation:

Block diagram:



## Input & Output Message:

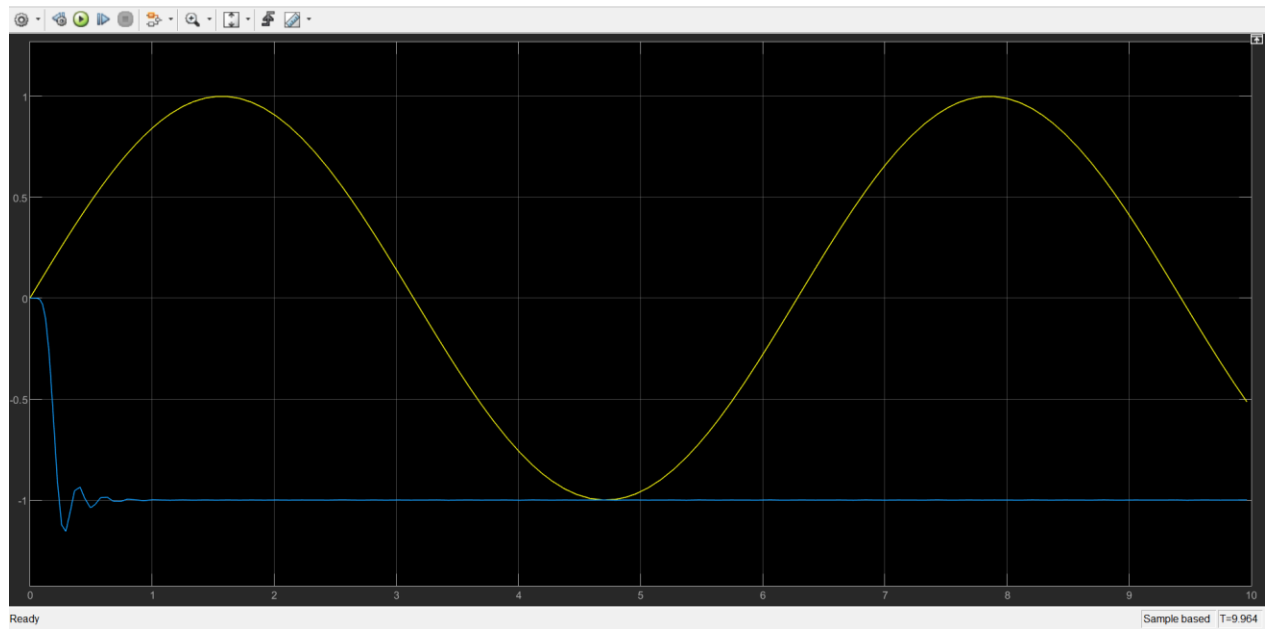
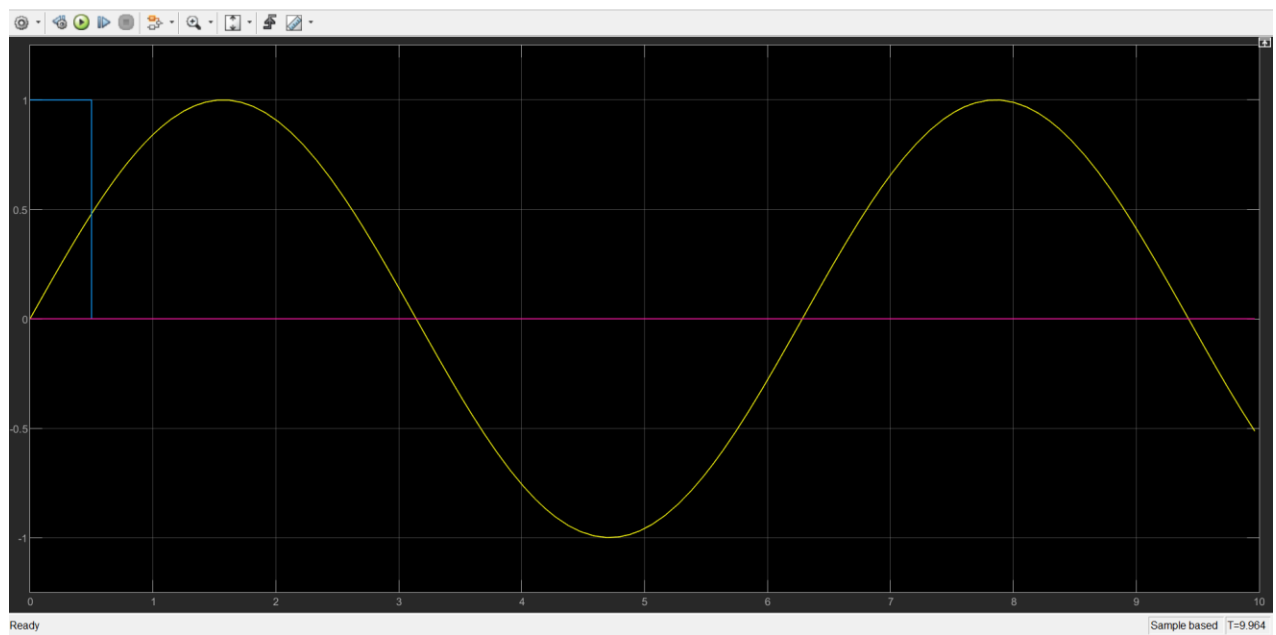
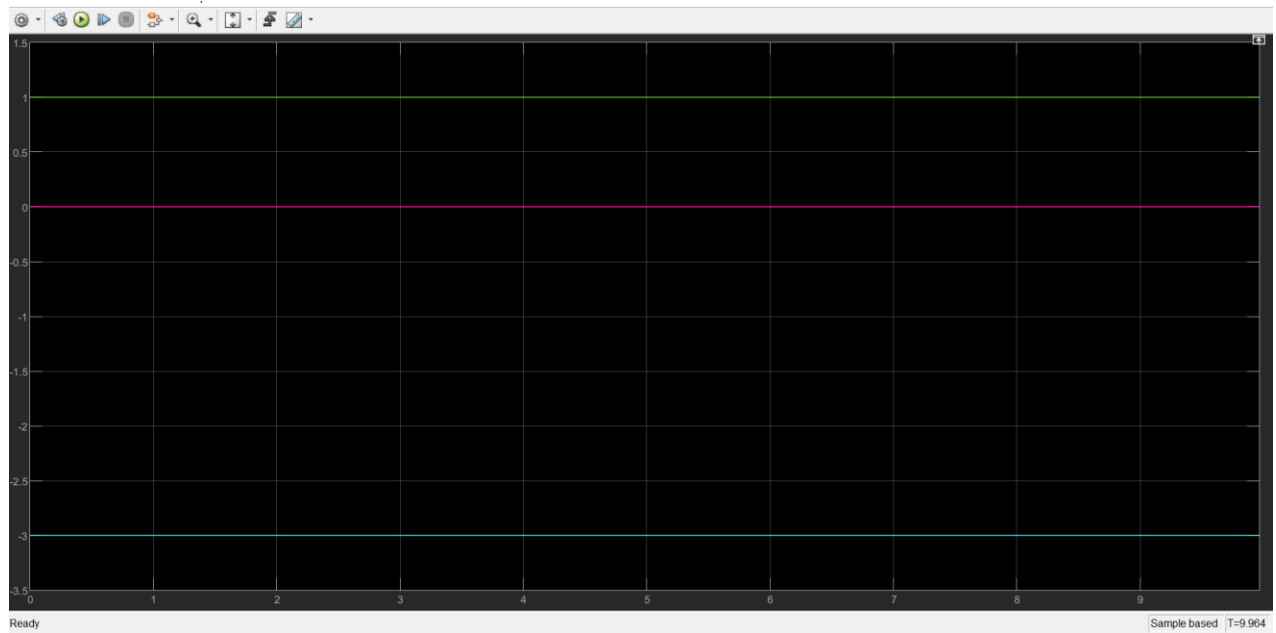


Fig: output message with respect to input

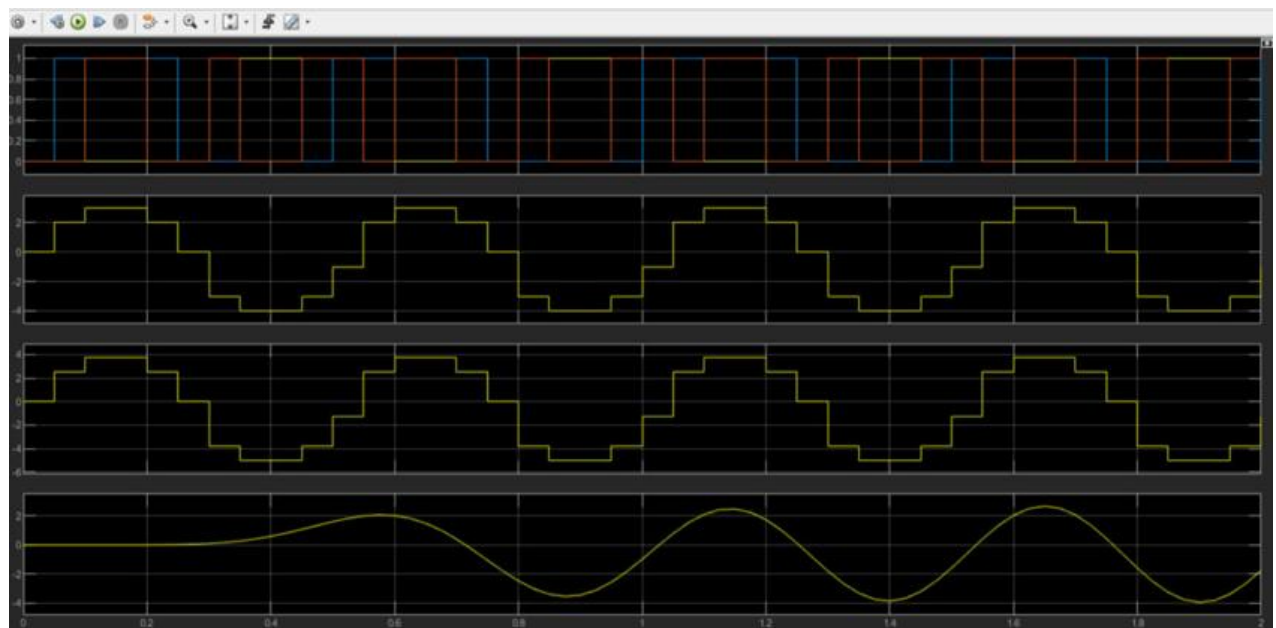
## Modulation:



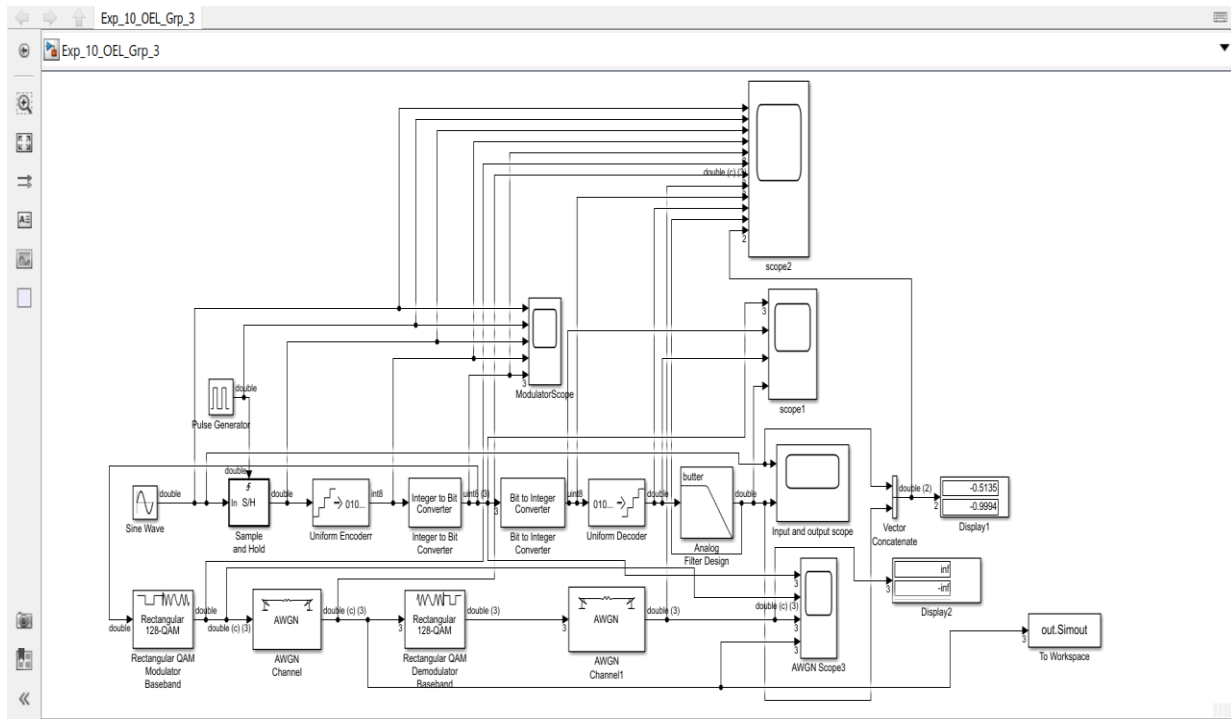
## Adding Noise:



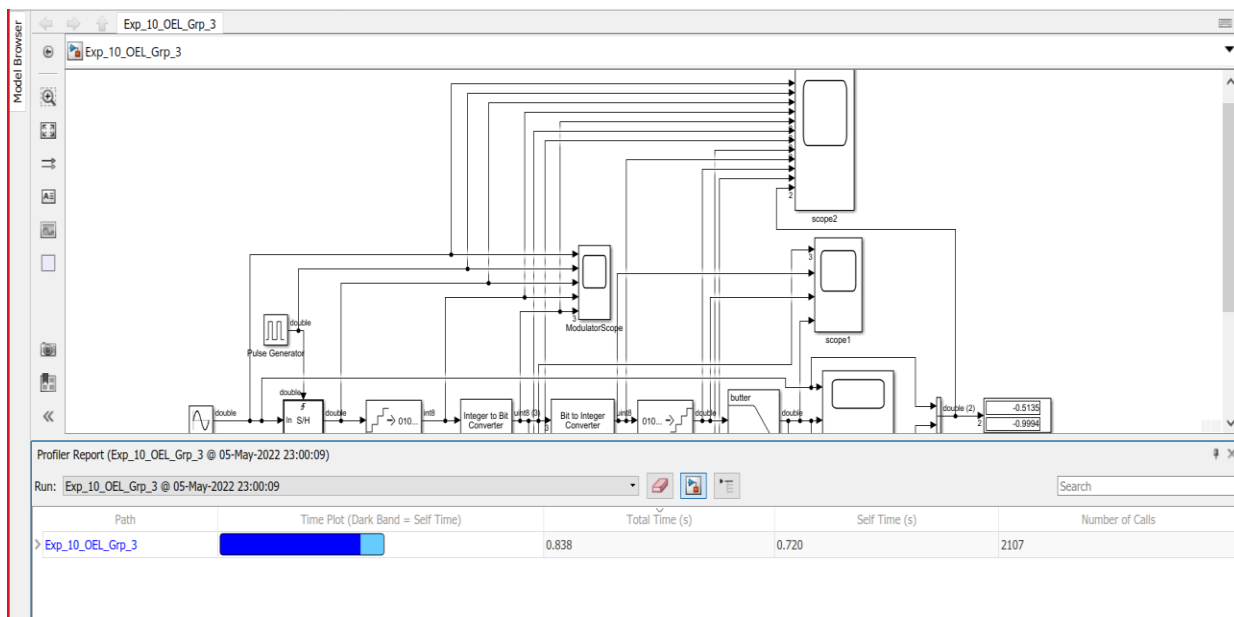
## Demodulation:



## Overall-process:



## Timing Diagram:



Comparison: The operation between QAM, ASK, FSK and PSK, the QAM is useful and have better output rather than ASK, PSK, FSK. In this experience we also get better output for QAM operation. Generally, QAM is combination of ASK & PSK modulation. This modulation is using now a days very highly.

Discussion: The goal of this experiment is to transmit and receive a message. A message signal is sent through a transmission medium and received at the receiver end. It can be seen that the message signal is distorted at the very beginning of the receiver end and then the signal has been as same as the sent message signal. It is because a small value of SNR is used which is 10; if the SNR value will be increased, the message signal will be more accurate. However, a message signal has been sent through the transmission medium and received more likely the sent message at the receiver end. The whole process has been done using block diagram at the Simulink as the simulation tool. In this experiment, this network was chosen. The process is divided into sampling, quantizing, and encoding mainly. Sampling has been done to convert the audio message from continuous-time to discrete-time. It needs to convert the audio into a digital signal, the process is called encoding.

#### References:

1. Prakash C. Gupta, "Data communications", Prentice Hall India Pvt.
2. William Stallings, "Data and Computer Communications", Pearson
3. A. "Data Communication and Networking. Tata McGraw." (2005).