بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِيمِ

رَبِّ اشْرَحْ لِي صَدْرِي

وَيَسِّرْ لِي أَمْرِي

اسم المادة:اساسيات الاتصالات

قسم تقنيات المعلومات والاتصالات

المرحلة الاولى

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Introduction

We will specialize in information transfer theory. A system is a combination of circuits and devices that are assembled to accomplish the desired task. Many means for the transmission of information have been used down through the ages ranging from the use of sunlight reflected from mirrors by the Romans to our modern era of electrical communications.

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That began with the invention of the telegraph in the 1800s.

A characteristic of electrical communication systems is the presence of uncertainty. This uncertainty is due in part to the inevitable presence in any system of unwanted signal perturbations, broadly referred to as noise in Fig.1, and in part to the unpredictable nature of information itself.

Systems analysis in the presence of such uncertainty requires the use of probability techniques.

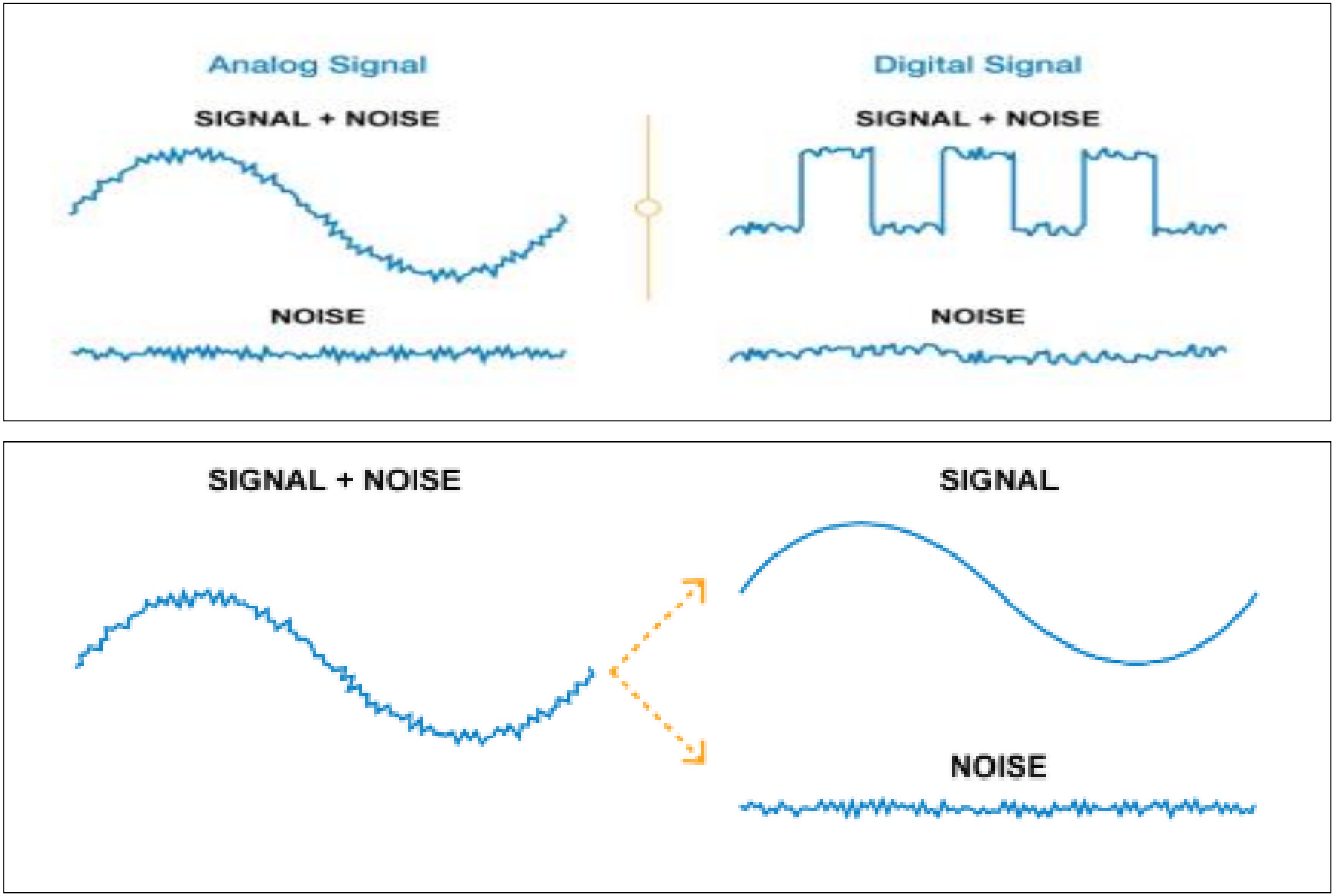

Fig. 1 Noise in Analog and Digital signals

Noise has been an ever-present problem since the early days of electrical communication, but it was not until the 1940s that probability systems analysis procedures were used to analyze and optimize communication systems operating in its presence.

Major historical facts related to the development of electrical communications are given in Table 1.

Table-1 Major Events and Inventions in the Development of Electrical Communications

Year	Event
1948	Claude Shannon's ''A Mathematical Theory of Communications'' is published
1950	Time-division multiplexing is applied to telephony
1960	First working laser demonstrated by Maiman of Hughes Research Labs (patent awarded to G. Gould after 20-year dispute with Bell Labs)
1962	First communications satellite, Telstar I, launched
1970	Low-loss optic fiber developed
1982	Compact disk (CD) audio based on 16-bit PCM developed

year	Event
mid-1990s	Second-generation (2G) cellular systems fielded
2001	Fielding of (3G) cellular telephone systems begins; WiFi and WiMAX allow wireless
2010	Introduction of fourth-generation (4G) cellular radio. Technological convergence of communications-related devices-e.g., cell phones, television, personal digital assistants, etc.
Now	Fifth -generation (5G)

It is an interesting fact that the first electrical communication system, the telegraph, was digital-that is, it conveyed information from point to point by means of a digital code consisting of words composed of dots and dashes. The subsequent invention of the telephone 38 years after the telegraph, wherein voice waves are conveyed by an analog current.