

Course No: MCA-2T5
Course Title : Advanced Data Communication

Unit I

Bandwidth and Channel Capacity. Quantifying Channel Capacity for noiseless channel(Nyquist Law) and noisy channel(Shannon's Law). Example of a digital telephone system to explain basic concepts of analog signals, digital signals, sampling. Data Rate versus Baud Rate.Nyquist Criterion for Sampling.Data transmission concepts. Characteristics of signals(amplitude, frequency, period,wavelength, Signal-to-Noise ratio). Key components in data communications systems.Simplified model. Local area network(LAN) concepts and characteristics.

Unit II

Wide area networks(WANs). WAN technologies (traditional packet and circuit switching, Frame Relay, ATM).ISDN(narrowband) concepts and services. Overview of the OSI model.Transmission media – factors affecting distance and data rate.Guided transmission media: Twisted-Pair, Co-axial Cable.Principles and advantages of optical networks.Types of optical fibers and lasers.

Unit III

Unguided transmission media: Terrestrial Microwave & Satellite Microwave systems and applications. Data encoding.Difference between modulation and encoding.NRZ-L, NRZ-I encoding.Multilevel Binary and Biphase Coding techniques and their implementations. ASK,FSK,PSK and QPSK. PCM concepts: sampling, quantization. Delta Modulation.Amplitude Modulation.

Unit IV

Reliable transmission of data: Asynchronous and Synchronous transmission. Error detection: Parity-based, CRC-based. FCS computation.Error control and recovery techniques.Concept of ARQ standard and its versions.Concept of Multiplexing.FDM.Synchronous and Statistical TDM.

Reference Books:

- 1.William Stallings, "Data and Computer Communications", Pearson Education
- 2.AndrewTanenbaum, "Computer Networks", Pearson Education 4/e.
3. Ulysses Black, "Principles of Data Communications ", PHI.
4. Morley, Gelber, "The Emerging Digital Future", Addison-Wesley.