

2CSE202: BASICS OF COMMUNICATION SYSTEMS

[3 0 2 4]

Learning Outcomes:

At the end of the course, the student will be able to:

- Analyze and design basic communications systems, particularly with application to noise-free analog and digital communications.
- Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.
- Assess and evaluate different analogue and digital modulation and demodulation techniques.
- Evaluate the influence of noise on communications signals.
- Define the basic principles, and network architectures and communication services.
- Identify and describe telephone, mobile phone and public data networks and resolve network-level related problems.

Syllabus:

Unit No	Topics
1	Introduction : Data Communications, Networks, Data Representation, Data Flow, Distributed Processing, Network Criteria, Physical Structures, Network Models, Categories of Networks, Intranet, The Internet, Protocols and Standards
2	Network Models : Layered Tasks, Sender, Receiver and Carrier Hierarchy, The OSI Model, Layers in the OSI Model, TCP/IP Protocol suit, Addressing – Physical, Logical, Port and Specific Addresses Data and Signals Analog and Digital Signals, Periodic and Non-periodic Signals, Sine Wave, Phase, Wavelength, Time and Frequency Domains, Composite Signals, Bandwidth, Bit Rate, Bit Length, Transmission of Digital Signals, Transmission Impairment, Data Rate Limits, Performance – Bandwidth, Throughput, Latency, Bandwidth-Delay Product, Jitter
3	Digital Transmission : Digital-to-Digital Conversion, Line Coding, Line Coding Schemes, Block Coding, Scrambling, Analog-to-Digital Conversion, PCM, DM, Transmission Modes – Parallel and Serial Transmission
4	Analog Transmission : Digital-to-Analog Conversion, Amplitude Shift Keying, Frequency Shift Keying, Phase Shift Keying, Quadrature Amplitude Modulation, Analog-to-Analog Conversion, Amplitude Modulation, Frequency Modulation, Phase Modulation

5	<p>Bandwidth Utilization: Multiplexing and Spreading :</p> <p>Frequency-Division Multiplexing, Wavelength-Division Multiplexing, Synchronous and Statistical Time-Division Multiplexing, Spread Spectrum</p>
6	<p>Transmission Media:</p> <p>Guided Media – Twisted Pair, Coaxial and Fibre-Optic Cable, Unguided Media – Radio Waves, Micro Waves and Infrared</p>
7	<p>Switching :</p> <p>Circuit-Switched Networks, Telephone Networks, Datagram Networks, Routing Table, Virtual-Circuit Networks, Structure of a Switch</p>
8	<p>Telephone and Cable Networks for Data Transmission :</p> <p>Telephone Network, Dial-up Modems, Digital Subscriber Line, Cable TV Networks, HFC Network, CM and CMTS, DOCSIS</p>

Reference Books:

1. Data Communication and Networking – 4th Edition By – Behrouz A Forouzan
2. Data and Computer Communications – 7th Edition By – William Stalling
3. Computer Networks – 4th Edition By – Andrew S Tanenbaum