

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY  
HYDERABAD

III Year B.Tech. CSE -I Sem

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DATA COMMUNICATION SYSTEMS

**Unit I :**

**INTRODUCTION TO DATA COMMUNICATIONS AND NETWORKING:** Standards Organizations for Data Communications, Layered Network Architecture, Open Systems Interconnection, Data Communications Circuits, Serial and parallel Data Transmission, Data communications Circuit Arrangements, Data communications Networks, Alternate Protocol Suites.

**SIGNALS, NOISE, MODULATION, AND DEMODULATION :**

Signal Analysis, Electrical Noise and Signal-to-Noise Ratio, Analog Modulation Systems, Information Capacity, Bits, Bit Rate, Baud, and *M*-ary Encoding, Digital Modulation.

**Unit II :**

**METALLIC CABLE TRANSMISSION MEDIA :**

Metallic Transmission Lines, Transverse Electromagnetic Waves, Characteristics of Electromagnetic Waves, Transmission Line Classifications, Metallic Transmission Line Types, Metallic Transmission Line Equivalent Circuit, Wave Propagation on Metallic Transmission Lines, Metallic Transmission Line Losses.

**OPTICAL FIBER TRANSMISSION MEDIA :**

Advantages of Optical Fiber Cables, Disadvantages of Optical Fiber Cables, Electromagnetic spectrum, Optical Fiber Communications System Block Diagram, Optical Fiber construction, The Physics of Light, Velocity of Propagation, Propagation of Light Through an Optical fiber Cable, Optical Fiber Modes and Classifications, Optical Fiber Comparison, Losses in Optical Fiber Cables, Light sources, Light Detectors, Lasers.

**Unit III :**

**DIGITAL TRANSMISSION :**

Pulse Modulation, Pulse code Modulation, Dynamic Range, Signal Voltage –to-Quantization Noise Voltage Ration, Linear Versus Nonlinear PCM Codes, Companding, PCM Line Speed, Delta Modulation PCM and Differential PCM.

**MULTIPLEXING AND T CARRIERS :**

Time- Division Multiplexing, T1 Digital Carrier System, North American Digital Multiplexing Hierarchy, Digital Line Encoding, T Carrier systems, European Time- Division Multiplexing, Statistical Time – Division Multiplexing, Frame Synchronization, Frequency- Division Multiplexing, Wavelength- Division Multiplexing, Synchronous Optical Network

**Unit IV :**

**WIRELESS COMMUNICATIONS SYSTEMS :**

Electromagnetic Polarization, Rays and Wavefronts, Electromagnetic Radiation, Spherical Wavefront and the Inverse Square Law, wave Attenuation and Absorption, Optical Properties of Radio Waves, Terrestrial Propagation of Electromagnetic Waves, Skip Distance, Free-Space Path Loss, Microwave Communications Systems, Satellite Communications Systems.

**Unit V :**

**TELEPHONE INSTRUMENTS AND SIGNALS:**

The Subscriber Loop, Standard Telephone Set, Basic Telephone Call Procedures, Call Progress Tones and Signals, Cordless Telephones, Caller ID, Electronic Telephones, Paging systems.

**THE TELEPHONE CIRCUIT:**

The Local Subscriber Loop, Telephone Message- Channel Noise and Noise Weighting, Units of Powers Measurement, Transmission Parameters and Private-Line Circuits, Voice-Frequency Circuit Arrangements, Crosstalk.

**Unit VI :**

**CELLULAR TELEPHONE SYSTEMS:**

First- Generation Analog Cellular Telephone, Personal Communications system, Second-Generation Cellular Telephone Systems, N-AMPS, Digital Cellular Telephone, Interim Standard, North American Cellular and PCS Summary, Global system for Mobile Communications, Personal Communications Satellite System.

**Unit VII:**

**DATA COMMUNICATIONS CODES, ERROR CONTROL, AND DATA FORMATS:**

Data Communications Character Codes, Bar Codes, Error Control, Error Detection, Error Correction, Character Synchronization.

**DATA COMMUNICATIONS EQUIPMENT:**

Digital Service Unit and Channel Service Unit, Voice- Band Data Communication Modems, Bell Systems-Compatible Voice- Band Modems, Voice- Band Modem Block Diagram, Voice- Band Modem Classifications, Asynchronous Voice-Band Modems, Synchronous Voice-Band Modems, Modem Synchronization, ITU-T Voice- Band Modem Specifications, 56K Modems, Modem Control: The AT Command Set, Cable Modems, Probability of Error and Bit Error Rate.

**Unit VIII:**

**DATA –LINK PROTOCOLS:**

Data –Link Protocol Functions, Character –and Bit- Oriented Protocols, Data Transmission Modes, Asynchronous Data – Link Protocols, Synchronous Data – Link Protocols, Synchronous Data – Link Control, High – Level Data – Link Control.

**TEXT BOOKS:**

1. Introduction to Data Communications and Networking, Wayne Tomasi, Pearson Education.

**Reference Books**

1. Data Communications and Networking, Behrouz A Forouzan, Fourth Edition. TMH.
2. Computer Communications and Networking Technologies, Gallow, Second Edition Thomson
3. Computer Networking and Internet, Fred Halsll, Lingana Gouda Kulkarni, Fifth Edition, Pearson Education