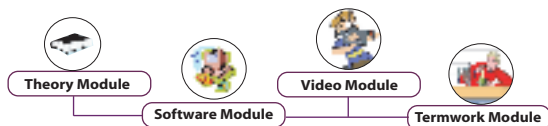


# Communication Systems

Introduces, Global e-Learning System in Education & Training in the form of Learning Resources with Computer Aided Instructions



System Requirement:- IBM-PC Compatible Min P-III with Window-OS, 128 MB RAM/Multimedia Kit

## Theory module

**Features :** Theory, Figures, Photographs, Animations With Controller, Highlighter Tool, Note Creation Facility, Systematic Page Navigation, Printing Facility, Access to Videos at Appropriate Locations.

## List of Topics

### Introduction to Electronic Communication System



Block Diagram of Basic Electronic Communication System, Classification of Electronic Communication Systems such as Radio, Television, Telephone, Microwave, Satellite, RADAR, Facsimile, Broadcast and Point to Point, Computer & Cellular Mobile into Wired and Wireless, Types of Information in the Above Communication Systems, Types of Signals: Analog and Digital, Frequency Spectrum, Bandwidth, Types of Transmission Media Used in the Above Communication Systems, Overview of Electronic Communication System Network in India.

### Transmission Media

Guided and Unguided Transmission Lines, Types of Transmission Lines, (Twisted Pair, Coaxial Cable), Propagation of Information in Transmission Lines, Bandwidth of Transmission Lines, Losses in Transmission Lines, Waveguides : Types of Waveguides, Propagation of Information in Waveguides, Bandwidth of Waveguides, Advantages of Waveguides Over Transmission Lines.

### Wave Propagation

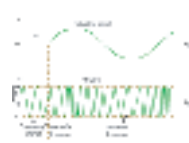
Introduction to Electromagnetic Waves & Spectrum, Polarisation of Electromagnetic Wave, Behavior of Transverse Electromagnetic Waves in Free Space & Effect of Environment on its Propagation such as Reflection, Refraction, Scattering, Diffraction & Interference, Ionosphere, Propagation of Electromagnetic Waves: Ground Wave, Sky Wave and Space Wave. Definitions: Actual Height, Virtual Height, Critical Frequency, Maximum Usable Frequency, Skip Distance & Fading, Duct Propagation, Tropospheric Scatter Propagation.



### Optical Fiber Cable

Advantages of Optical Fiber Cable, Propagation of Energy in Fiber Cable: Total Internal Reflection, Acceptance Angle & Numerical Aperture, Construction, Characteristics, Specifications & Applications of Single Mode Step Index Fiber, Multimode Step Index Fiber, Multimode graded Index Fiber, Losses in Optical Fiber Cable Due to Dispersion, Scattering & Bending, Connector Loss, Splice Loss & Coupling Loss.

### Amplitude Modulation



Definition of AM & Modulation Index, Effect of Modulation Index on AM Signal, Mathematical Representation of AM Signal, Bandwidth of AM Signal, Representation of AM in Time & Frequency Domain, Power Relations in AM, Block Diagram, High Level, Low Level, Working With Waveforms, Demodulation of AM by Practical Diode Circuit, AM Superheterodyne Radio Receiver: Block Diagram, Working With Waveforms, Need for AGC: Types: Simple & Delayed, Explanation With Graph, Antenna: Ferrite Loop Antenna.

### Frequency Modulation

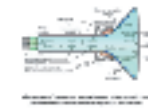
Definition of FM, Deviation Ratio, Maximum Deviation Ratio, Mathematical Representation of FM and its Analysis, Representation of FM in Time & Frequency Domain, Bandwidth of FM, FM Transmitter: Block Diagram, Direct & Indirect, Explanation of Each With Waveforms, Demodulation of FM: Balanced Slope Detector, Phase Shift Discriminator, Ratio Detector, Circuit Diagram, Working & Waveform, FM Receiver: Block Diagram, Explanation With Waveforms.

### Pulse Modulation

Sampling Theorem, Sampling: Natural & Flat Top, Nyquist Rate, PAM, PWM & PPM: Waveforms, Generation Block Diagram, Applications, Advantages & Disadvantages, PCM: Generation Block Diagram, Applications, Quantization, Quantization Error Companding & Expanding, PCM: Demodulation Block Diagram, FSK and PSK: Generation & Applications.

### Television System

Fundamental Concepts in T.V. System: Difference Between Audio Signal & Video Signal, Aspect Ratio, Image Continuity, Interlace Scanning in Detail, Horizontal & Vertical Resolution, Vestigial Sideband Transmission, Properties of Colour: Hue, Saturation, Brightness, Contrast, Luminance. Compatibility, Three Colour Theory, Primary & Secondary Colours, Additive Mixing, Composite Video Signal: Explanation With Figures of Pedestal Height, Blanking Pulses, Synchronization Pulses, Peak White Level, Black Level, Block Diagram of Monochrome T.V. Transmitter & Receiver, CCIR - B Standards for Colour T.V. Signal Transmission & Reception, T.V. Channel Allocation for Band I and Band III, Basic Colour Camera Tube: Explanation With Block Diagram, Colour T.V. Picture Tube: Working Principle, Colour T.V. Transmitter: PAL D Coder: Frequency Interleaving, Quadrature Modulation, Weighting Factors, Colour T.V. Receiver: PAL D Decoder: Block Diagram With Explanation, T.V. Antenna: Transmitting: Turnstile, Receiving: Yagi Uda & Parabolic Reflector, T.V. Transmitters in India.



### Satellite Communication System



Satellite Communication System: Block Diagram With Explanation, Classification of Satellites (Active, Passive, Synchronous & Asynchronous), Satellite Look Angles (Elevation and Azimuth), Uplink and Downlink Frequencies Used, Satellite Footprints & Altitudes, Ground Station: Block Diagram, Satellite Receiver, Satellite Receiver: Block Diagram, Functions of All the Controls, Connection Diagram, Satellite Applications: Block Diagram of Cable T.V., Satellite Antennas, Satellites of India & Ground Stations in India.

### Fiber Optic Communication System

Block Diagram of Optical Communication System, Optical Transmitters: LED and LASER (specifications), Optical Receivers: PIN Photodiode & Avalanche Photodiode, Application of Optical Systems: LANs, Telephones etc, Optical Fiber Networks in India.

### Data Communication Systems

Introduction to Data Communication Systems & Networks, LAN, MAN & WAN, Baseband & Broadband, Concept of Digital to Digital Conversion: Encoding Techniques: Non polar, Polar & Bipolar, Modes of Data Transmission: Parallel, Serial, Synchronous, Asynchronous, RS 232 Standard for Serial Communication, Multiplexing: TDMA, FDMA and CDMA (only concept) MODEM: Block Diagram & Classification, INTERNET: Types of Subscriber Lines, Operation of Internet (only concepts), Internet Service Providers in India.

### Cellular Mobile and Facsimile Communication Systems

Cellular Mobile, Block Diagram of Cellular Mobile Communication System, Cellular Concept: Cell Size, Cell Splitting, Operation of Cellular System in Four Modes & Handoff Mechanism, Frequencies Used & Concept of Frequency Reuse, Cellular Mobile Networks in India, Facsimile Block Diagram of Facsimile Communication System (Transceiver), Conversion of Image into Electrical Signal, Scanning Mechanism in a FAX Machine, Concept of Data Compression.

### Software Module

Interactive Learning Makes it Easy to Understand the Concepts of Subject. This Module Helps in:-

- ★ Communication Over All Currently Used Media- Including Wire, Radio & Optical Channels.
- ★ Highly Interactive, Technology-Driven Learning Experience Based in Circuit Simulation.
- ★ Experiments That Cover the Basic Concepts of Analog & Digital Communication System.
- ★ Understanding of the Application of Communication Systems.
- ★ Use of Transmission Lines & Antennas, & Many More.....



### Video Module

Optical Fiber Network, Colour T.V. picture tube, Satellite Ground Station, Networks: LAN, MAN & WAN, Cellular Concept & Facsimile Communication System.

### Termwork Module

Contains Assignments on Various Topics Covering Subjective Questions, Objective Questions, Random Selection of Objective Type Questions, Numerical Assignments, Video Assignments.

