

# Networking & Security Management

## Session 1: Introduction

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1. Computer Network, Layered Network Architecture-Review of ISO-OSI Model.
2. Transmission Fundamentals- Communication Media-Conductive Metal (Wired Cable).
3. Optical Fiber links, Wireless Communication-Radio links, Satellite Links, Communication Services & Devices, and Telephone System.
4. Integrated Service Digital Network (ISDN).
5. Cellular Phone, ATM, Modulation & Demodulation-Digital to Analog Conversion-Frequency Modulation (FM), Amplitude Modulation (AM), Phase Modulation (PM).
6. Analog to Digital Conversion-Pulse Amplitude Modulation (PAM).
7. Pulse Code Modulation (PCM), Differential Pulse Code Modulation, (DPCM).
8. Modem & Modem Types, Multiplexing- Frequency Division Multiplexing (FDM), Time Division Multiplexing (TDM), Statistical Time Division Multiplexing (STDM).
9. Contention Protocol- Stop-Go Access Protocol, Aloha Protocol-Pure aloha & Slotted aloha.
10. Carriers sense multiple access with collision detection (CSMA/CD).

## Session 2: Data Security and Integrity

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1. Parity Checking Code, Cyclic redundancy checks (CRC).
2. Hemming Code, Protocol Concepts – Basic flow control.
3. Sliding window protocol-Go-Back-N protocol and selective repeat protocol.
4. Protocol correctness- Finite state machine.

## Session 3: Local Area Network

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1. **Local Area Network:** Ethernet: 802.3 IEEE standard.
2. Token Ring: 802.5 IEEE standard, Token Bus : 802.4 IEEE standard.
3. FDDI Protocol, DQDB Protocol, Inter Networking.
4. Layer 1 connections- Repeater, Hubs.
5. Layer 2 connections- Bridges, Switches.
6. Layer 3 connections- Routers, Gateways.

## Session 4: Wide Area Network

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1. **Wide Area Network:** Introduction, Network routing, Routing Tables.
2. Types of routing, Dijkstra's Algorithm, Bellman-Ford Algorithm, Link state routing.
3. Open shortest path first, Flooding, Broadcasting, Multicasting, Congestion & Dead Lock.
4. Internet Protocols, Overview of TCP/IP.
5. Transport protocols, Elements of Transport Protocol.
6. Transmission control protocol (TCP), User data-gram protocol (UDP).

## Session 5: Network Security

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1. Network Security, Virtual Terminal Protocol, Overview of DNS, SNMP, email, WWW, Multimedia.

## Book References

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1. A.S.Tanenbaum, “Computer Network”, 4th addition,PHI.
2. Forouzan “Data Communication and Networking 3ed”, TMH.
3. J.F.Hayes, “Moduling and Analysis of Computer Communication Networks”, Plenum Press.