

# Course Outline



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## Introduction to Data Communications & Networking

### Course Description:

The objective of this course is to provide an in-depth introduction to all aspects of current computer networks. A wide range of topics including cabling, signaling, serial, wide and local area networks, network protocols and network operating systems in use today are discussed.

### Pre-requisites:

There are no pre-requisites, to this course, however previous exposure to networking would be an advantage.

### Course Content:

- **Reference models**
- **Serial Networks & Protocols**
- ISO OSI reference model
- Introduction
- DTE & DCE
- Common Uses of Serial Cables
- Common Data Rates
- Flow Control
- Serial Cable Standards
- V.24 / EIA232
- Balanced Interfaces
- Universal Serial Bus (USB)
- Firewall

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- **Analogue WANs**
  - Problem with Analogue WANs
  - Digital Solution
  - Analogue Service to the Customer
  - Public Switched Telephone Network (PSTN)
  - Leased Line
  - Asynchronised Digital Subscriber Line (ADSL)
  
- **Modems**
  - PSTN Modems
  - Line Drivers (Short Range Modems)
  - Leased Line Modems
  - High Speed Modems
  - Modem Modulation Standards
  - AT Commands
  - V.25BIS Commands
  
- **ISDN**
  - Basic Features
  - Application for ISDN
  - ISDN Channels
  - Available ISDN Services
  - ISDN Devices & Network Points
  - Basic ISDN Numbering
  - ISDN Equipment
  
- **Multiplexing**
  - Uses for Multiplexors
  - Types of Multiplexor
  - Integrating Voice, Video & Data
  
- **Digital Subscriber Line (DSL)**
  - ADSL Service
  - RDSL Service
  - ADSL Architecture
  - Digital Lease Lines
  - BT Kilostream

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- **Digital Subscriber Line (DSL)**
  - Plesiochronous Digital Hierarchy (PDH)
  - SONET and Synchronous Digital Hierarchy
  
- **Mobile Communications**
  - The Basics
  - Advanced Mobile Phone Service (AMPS)
  - Network Access Methods
  - Frequency Division Multiple Access (FDMA)
  - Time Division Multiple Access (TDMA)
  - Wireless Application Protocol (WAP)
  - Global Systems for Mobile Communications (GSM)
  - General Packet Radio Service (GPRS)
  - 3G Networks and 3GSM
  - Enhanced Data for Global Evolution (EDGE)
  
- **Packet Switched Networks**
  - The Problem with Circuit Switched Networks
  - The Problem With ISDN & Point to Point Leased Lines
  - Packet Switched Networks
  - Cost Efficiency
  - Delays
  - How do Packet Switched Networks Work
  - The Public Data Network (PDN)
  - Types of Packet Switched Networks
  
- **X.25**
  - DTE & DCE
  - Permanent Virtual Circuits
  - SVC Addresses
  - X.25 Network
  - X.25 Data Terminal Equipment
  - Connecting to an X.25 Network

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- **X.25**
  - X.25 Operation
  - X.25 Frame Format
  - X.25 Packet Format
  
- **Frame Relay**
  - Permanent Virtual Circuits
  - Improved Performance
  - Connecting to a Frame Relay Network
  - Preventative Congestion Control
  - Explicit Congestion Notification (ECN)
  - Frame Relay Frame
  
- **Asynchronous Transfer Mode (ATM)**
  - Traffic Nature
  - ATM Reference Model
  
- **Switched Multi-Megabit Data Service (SMDS)**
  - Connection Less
  - Congestion and Flow Control
  - Fully Meshed Networks
  - SMDS Addresses
  - Transmission Speeds
  - LAN-Like Behaviour
  - SMDS Providers
  
- **Introduction to Local Area Networks**
  - Types of LAN
  - MAC Addresses
  - Packet Addressing
  - LAN Equipment
  - Network Protocols
  
- **LAN Physical Layer**
  - Ethernet
  - Gigabit Ethernet
  - 10 Gigabit Ethernet
  - Token Ring
  - Fibre Distributed Data Interface (FDDI)

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- **LAN Physical Layer**
  - **The Data Link Layer**
  - **Network Connection Concepts**
  - **Introduction to IPX**
  - **Introduction to IP**
  - **Analogue & Digital Signaling**
- Wireless LANs
  - LAN Physical Layer Frames
  - Ethernet Frame Types
  - The Token Ring IEEE 802.5 Frame
  - The Wireless IEEE 802.11 Frame
  - The FDDI ISO9314 Frame
  - Layer 2 Information Fields
  - Notes on Frame Type Used with Ethernet
  - Local Topologies
  - Remote Connections
  - Bridging
  - Switching Hubs
  - The IPX Protocols
  - IPX Addressing
  - IPX Sockets
  - Service IPX Address
  - IPX Packet
  - Routing Information Protocol (RIP)
  - Service Advertisement Protocol (SAP)
  - Reducing RIP & SAP Traffic over WAN Links
  - Netware Core Protocol
  - Sequenced Packet Exchange
  - IP Addresses
  - Introduction to Routers
  - TCP/IP Naming Schemes
  - The Subnet Masks
  - Digital Data Over Analogue Network

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- **Analogue & Digital Signaling**
- **LAN Protocols over Serial Networks**
- Digital Data over Digital Network
- Analogue Data over Digital Network
- Introduction to Serial Networking
- Serial Line Internet Protocol (SLIP)
- Point to Point Protocol (PPP)

**Course Duration:**

**3 Days**

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