

Course Code - TEL13001

Broadband Technologies

The course focuses on theoretical principles of xDSL Technologies, looking at the various implementations of xDSL, the physical architecture needed to deliver xDSL and the equipment and protocols that are needed to service an xDSL environment.

Aim: To provide delegates with a fundamental understanding of xDSL and the protocols and standards associated with it as well as the physical components of xDSL networks.

Objectives:

By the end of the course you will be able to.

- Understand Basic Telephony.
- Understand Telephone Network Architecture.
- Describe Digital Transmission Technology.
- Understand ISDN Basics.
- Describe DSL Family variations such as HDSL, SDSL, ADSL, VDSL.
- Have an appreciation of alternative Broadband Technologies.
- Describe End User Equipment and Protocols.

Course Breakdown:

Recap on Telephone Technology

- How a simple telephone works
- The Analogue Local Loop
- Analogue Telephone Transmission
- The Evolution of Telephone Switching
- The Public Switched Telephone Network
- Multiplexing
- The Street Cabinet
- Dial up Access
- Narrowband ISDN
- Broadband ISDN
- ISDN Architecture
- BRI and PRI
- ISDN Reference Point
- Digital Transmission Technology
- Line Coding
- QAM – Quadrature Amplitude Modulation
- CAP – Carrierless Amplitude with Phase
- DMT – Discrete Multitone
- Error Detection and Correction
- Protocol Adaptation
- Transmission Medium Limitations
- Frequency Response

Course Code - TEL13001

- Crosstalk
- Bridge Tap Reflections
- Audio Coil Loading

Introduction to xDSL

- Where did it all begin?
- HDSL
- SDSL
- ADSL
- RADSL
- CDSL
- VDSL

Alternative Broadband Technologies

- CATV Systems
- First Generation One Way Modems
- HFC – Hybrid Fibre Coax
- Wireless Cable Systems
- WLL – Wireless Local Loop
- Wimax
- WiFi
- IBSS
- BSS
- ESS
- Wireless Bridges
- WiFi Security
- Fibre Systems

End User DSL Equipment and Protocols

- DSL End User Devices
- Modems
- Microfilter
- Cable Modems
- Residential Gateway / Router
- ADSL Modem / Router Protocols
- ATM – Asynchronous Transfer Mode
- NAT – Network Address Translation
- DHCP – Dynamic Host Configuration Protocol

End User DSL Equipment and Protocols

- Broadband Aggregation Introduction
- CPE – Customer Premises Equipment
- NAP – Network Access Provider
- Subscriber Termination
- SLC Operation
- Aggregation Devices
- Typical ISP Network Topology
- MPLS Overview (Brief)

Course Code - TEL13001

- NSP – Network Service Provider
- Service Provider Retail Services
- Service Provider Wholesale Services
- ATM Bridging and Routing Methods
- PPP – Point to Point Protocol
- Broadband Access Methods
- PTA – PPP Termination Aggregation
- L2TP – Layer 2 Tunnelling Protocol
- AAA – Authentication, Authorisation and Accounting
-