Foundation In Telecommunications

COURSE DESCRIPTION:

This course has been designed for people wanting to gain an understanding of the modern world of telecommunications with a view to moving into the telco industry. Starting from the beginning, it will explain the main principles of Voice, Data, Video and Text communications over fixed line (copper and fibre) and wireless (wi-fi, mobile, radio and satellite) networks. Learn how technologies have moved from circuit switched voice over copper networks to newer packet switched data over fibre and mobile networks.

No previous experience is required – this is a foundation course

WHO SHOULD ATTEND:

Anyone looking to understand todays telecommunications technologies and how they work together to provide the services we require for our business and personal applications.

SOME COURSE BENEFITS:

- Understand the language and acronyms surrounding telecommunications
- Understand how the different technologies fit together
- Understand networks and applications
- Have credible conversations around technology & products with your peers and customers
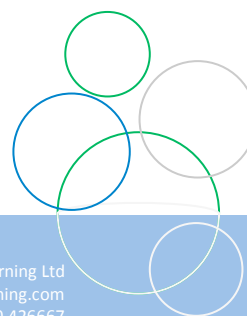
COURSE OBJECTIVES:

- To clarify the language & technologies surrounding telecommunications networks
- To provide a foundation knowledge level
- To explain the technologies involved in making current networks function

DURATION:

- Five Days

PRICE:

- $1,995.00 per person including lunch and refreshments

CONTENT:

Day 1 – The Big Picture

- Terminology exercise
- Voice and data
- Real time & non real time traffic
- Analogue & digital
- Circuits & packets
- Transmission Mediums
    - Copper
    - Fibre
    - Wireless
- The aging Local Loop
    - PSTN
    - ISDN (BRI & PRI)
    - x-DSL
- LAN's & WAN's
- The new fibre UFB
- A Simple Reference Model
- National Broadband Projects Explained
- Fibre Optic Technology basics
- Fibre Optic Networks and Applications
- Multiplexing – Getting more from the line.
- Encoding
    - PCM (G.711) - voice
    - ASCII – data
    - Binary, MP3, JPEG, MPEG
- Mobile Networks : 1G to 4G, AMPS to LTE & Wi-MAX Overview
- Local Area Networks (LAN's)
- Wide Area Networks (WAN's)
- The Internet
- The Worldwide Web

Day 2 – Layer 1: Fibre Optics

- The principles of light (simplifying the language)
- Fibre optic system basics
- Fibre safety considerations
- Single mode & multi mode fibres
- Fibre construction
- Fibre connectors
- Connector colour codes
- Fibre cables
- Air blown fibre
- LED's & lasers
- Fibre receivers
- Attenuation (loss)
- Dispersion, CD & PMD overview
- Wavelength multiplexing
   - CWDM
    - DWDM
    - ROADM's
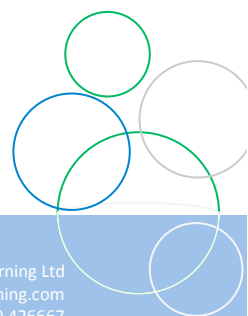
- G-PON and FTTX
- The UFB (NZ) & NBN (AU)
- Fibre care and cleaning (practical)
- Fibre cable preparation (practical)
- Fibre fusion splicing (practical)
- Fibre testing theory
- Visible fault locators, light source, power meters
- OTDR's
    - Basic Measurements
    - Results interpretation
- Fibre Optic Applications
- Optical Transport Networks (OTN) overview

Day 3 – Layer 2: PDH & SDH

- Transport network evolution
- PDH technology hierarchy
- G.711 encoding
- G.703 & G.704 framing (E1)
- Multiframes
- Signalling: CAS & CCS
- Alarms and errors
- Higher order PDH (E2 – E4)
- SDH network overview
- SDH network elements
- SDH related ITU-T standards
- Network topologies and transmission media
- Timing and network synchronisation
- The STM-1 framing structure
- Regenerator section overhead
- Multiplexer section overhead
- Path overhead
- Pointer concepts
- Container, virtual containers, administrative units and jargon
- Mapping 2Mb, 34Mb and 140Mb signals into SDH STM-1 frames
- PoS - New SDH – Ethernet over SDH
- GFP, VC & LCAS for frame based service mapping
- SDH alarms
- Higher order SDH signals (STM-4 thru STM1024)

Day 4 – Layer 2: Ethernet & Carrier Ethernet

- LAN's – Ethernet, Speeds, Cabling,
    - Hubs
    - Switches
    - Routers
    - Servers
    - Firewalls
- Ethernet Framing – DIX-V2 and 802,3
- LLC & SNAP
- MAC addressing
- Switched Ethernet
- V-LAN's – Port based, V-LAN tagging, (802.1Q) headers
- 802.1p (support QoS/CoS)

COMMS
LEARNING
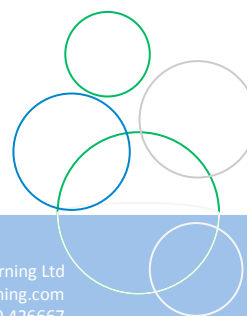
- MAC & VLAN limitations
- Metro Ethernet
- Ethernet Virtual Circuits
- MetroE Services (E-Line and E-LAN)
- MAC in MAC
- Q in Q
- Carrier Ethernet Traffic Profiles
  - Committed Information Rate
  - Committed Burst Size
  - Excess Information Rate
  - Excess Burst Size
  - Peak Information Rate
- Traffic Shaping (customer)
- Traffic Policing (carrier)
  - Single and Dual Leaky Bucket Algorithms
- Ethernet Testing
  - RFC2544 (UNI Testing)
  - Y.1564 (EVC Testing)

Day 5 – Layer 3: TCP/IP & Converged Networks

- Modern data applications explained
- How throughput, latency, loss & jitter affect applications
- The TCP/IP protocol stack
- The evolution of the Internet
- IP addressing (IPv4) – Public, private, static & dynamic
- IP v4 sub-netting – Why and how it is used (with exercises)
- IP version6 – It's purpose.
- IPv6 Addressing, Security, header format, compatibility with IPv4
- CoS & QoS in IP networks
- Ports, TCP and UDP – Quality of service for IP
- IP supported protocols: DNS, DHCP, ICMP
- TCP/IP related application protocols – FTP, HTTP
- Routing overview (BGP, OSPF, IS-IS)
- Routing vs. switching
- Voice over IP
  - Applications
  - Terminology
  - Components
  - RTP, RTCP and call quality
- Issues with VoIP
  - Delay
  - Packet Loss
  - Jitter
- Signalling Overview (SIP)
- Multi Protocol Label Switching
  - Labels
  - Label switching routers
  - Label switched paths
  - Label distribution protocol
- Virtual Private LAN Segment (VPLS – Multipoint to Multipoint)
- Virtual Private Wire Service (VPWS-Point to Point)
- The Converged "All-IP" Network – what the future holds.