Course Code - TEL13003

Introduction to Telecommunications

This course focuses on the fundamentals of telecommunications and describes the evolution of telecommunications, advancements in telecommunications technologies and takes a brief look at the future of telecommunications.

The invention of the telegraph in support of the railways in the United States heralded the start of telecommunications, and was a revolutionary concept at the time. Alexander Graham Bell couldn't have known how his simple invention would have such a profound impact on the World we live in. The actual basic telecommunications architecture hasn't changed since the early days, with the need for simple endpoints (telephones), a means of local signalling, centralized control and call management and of course a transmission medium. Finally the Cell Phone gave us the mobility and ability to communicate from almost anywhere through the use of wireless technologies.

Prerequisites:
None

Aim:

To provide delegates with an overview and knowledge on basic terms and definitions used in the telecommunications industry. This course is suitable for delegates with no prior knowledge of telecom technologies or the telecoms industry.

Objectives:

By the end of the course you will :

- Understand how technology has driven the telecommunications industry.
- Understand the key technologies deployed within most telecoms networks globally.
- Understand the basic building blocks of telecommunications networks.
- Have an appreciation of how telecommunications networks are evolving to keep pace with customer demand.

Course Profile

Introduction to Basic Telephony

- Public Telecoms Networks
- The Birth of Telephony
- Strowger
- A Network is?

- Switching and Transmission
- What is a Switch
- Switch Types
- Exchange Services
- Exchanges
- Transmission Lines
- Dedicated and Switched Lines
- Leased Lines
- Signalling
- Switching and Signalling Networks
- Call Reference Model
- Anatomy of a Voice Call
- Cell Sequences
- Evolution of the Market
- Telecoms Standards

Transmission

- Analogue and Digital Lines
- Errors
- Bits, Bytes, Hertz and Wavelength
- Optical and Radio Channels
- Scales and Ranges
- Full and Half Duplex
- Connection Orientated Communications
- Connectionless Communications
- Modems and Codecs
- Voice Characteristics
- Turning Voice into Data
- The Encoding Process
- Analogue to Digital and Digital to Analogue
- Transmission Lines
- Multiplexing
- Primary Rate Multiplexing (PDH)
- Time Division Multiplexing
- European Multiplexing
- PDH – Plesiochronous Digital Hierarchy
- SDH – Synchronous Digital Hierarchy
- SDH Operation
- SDH Frame Format
- So what is SONET?
- Statistical Multiplexing

- Frequency Division Multiplexing
- Why Fibre Optics?
- Fibre Optic Basic Operation
- Single mode vs Multimode Fibre
- Different Frequencies behave differently
- Getting More out of Fibre
- WDM – Wavelength Division Multiplexing
- CWDM – Coarse Wavelength Division Multiplexing
- DWDM – Dense Wavelength Division Multiplexing

Signalling

- Digital Switching
- Signalling
- Signalling Requirements
- Types of Traditional Signalling
- Local Loop Signalling
- Tone Dialling Telephones
- Local Telephone Signalling
- QSIG and DPNSS
- DSS1
- ISDN Signalling is Q.931
- Signalling System 7
- Non-Intelligent Network
- What is an Intelligent Network
- IN Physical Architecture
- Call Centres
- VPNs

Digital Subscriber Line

- ISDN – Integrated Services Digital Network
- The end of the Analogue Core
- ISDN Formats
- Use of ISDN
- Broadband ISDN
- DSL Timelines
- Basic xDSL System
- xDSL Family
- Broadband Aggregation Introduction
- HDSL – High Speed Digital Subscriber Line
- SDSL – Synchronous Digital Subscriber Line

- ADSL
- RADSL
- Service Provider Retail Service
- Service Provider Wholesale Service
- VDSL
- FTTC and FTTH
- DSL Comparison
- Cable Modems
- CATV
- Electricity Cables
- WLL – Wireless Local Loop

NGN and VoIP

- Next Generation Networks
- Why Voice over IP?
- VoIP Patterns of Use
- VoIP Usage Aspects
- VoIP – The Protocols
- Voice Compression
- Standards and Framework
- SIP – Session Initiation Protocol
- SIP Components
- NGN Benefits
- Traditional Telephone Systems
- SoftSwitch Solution
- Multicasting

Telecoms Major Players

- UK Carriers
- Telecoms Equipment Vendors
- Systems Integration
- Triple-Play Service Providers