3G & 3.5G Explained

DURATION

2 Days

COURSE DESCRIPTION

3G systems and services are making a significant impact on the Mobile Telecommunications Industry – providing an enhanced user experience, and changing the way content, services and applications are delivered to the end-user.

Covering 3G Technologies such as W-CDMA, HSDPA, HSUPA, cdma2000, IP and IMS, as well as services and applications (including: content distribution, wireless Voice over IP (wVoIP), and mobile TV services), and handsets – this course provides an excellent grounding for those who need to understand the scope, implementation options, business drivers, and rollout strategies for 3G systems.

This course also examines the evolving role of 3G (including its capabilities, strengths and limitations), and provides a useful guide to how it fits with existing 2G (including 2.5G and 2.75G technologies), and other radio technologies such as WiFi and WiMAX as the Universal Mobile Telecommunication System (UMTS) within the converging world of telecommunications.

PRE-REQUISITES

A basic understanding of telecommunication networks would be an advantage, but is not essential.

COURSE OBJECTIVES:

At the end of the course, the delegate will be able to:

- Identify the principle requirements driving the development and introduction of 3G technology and services
- Chart the migration strategies towards 3G including the radio network and core network requirements, as well as the evolution towards an all IP system
- Identify and discuss the requirements, and likely success, of specific 3G services, including the customer requirements and impact on network and service provision
- Explain how the requirements for the 3G network are in practice being met
- Draw a simplified schematic diagram showing the network and service architectures of the evolving 3G system, including: the access and core networks; the IP Multimedia Subsystem (IMS); Service Delivery Platforms and other service platforms; content servers; billing systems; and third-party interfaces
- List the primary capabilities, advantages, and requirements of 3G CDMA technology, as well as describing the resulting impact on services
- Explain the principles of CDMA technology and how this is applied to the W-CDMA radio interface used in UMTS (including HSDPA and HSUPA), and within the cdma2000 system
- Usefully compare the suitability of 3G technology with other radio access schemes such as WiFi and WiMAX for specific scenarios / applications
Discuss with confidence, some of the issues related to planning 3G radio networks, including 2G and 2.5G co-planning, as well as the possible roles of WiFi and WiMax within the overall (converged) system.

Consider the likely role of 3G systems in the converging world of telecommunications.

Specify the fundamental requirements of a 3G handset, including both radio / hardware (including battery, interfaces, and screen requirements), and software / application modules.

Describe the likely effect on user experience that the evolution from 2G to 2.5G to 3G will have at each stage, including the affect of HSDPA and HSUPA.

List key billing and charging requirements for the evolving IP-based services and applications.
Evolution to 3G and Services Overview
- Standardisation, ITU/IMT2000, ETSI, 3GPP and 3GPP2
- Evolution to 3G
- UMTS Services
  - UMTS Bearers
  - UMTS Teleservices, Service Capabilities and Supplementary Services
  - Multimedia Services
  - Role of Service Platforms
- CDMA 2000 services (Dave)
  - Standard Services
  - Service Capabilities
- Example 3G Content and Services

The Network Infrastructure
- The network: what does it do?
- Circuit or packet switched?
- The Core Network (from 2G to 3G)
- Switches and routers
  - Circuit Switched: Mobile Switching Centres
  - Packet Switched: GPRS Support Nodes
  - Signalling: SS7
- Controlling the network
  - Mobility
  - HLR, VLR, EIR and AUC
  - Services Platforms
- Evolving the 3G core network
- The Radio Network
  - 2G / 2.5G Radio Elements
    - Base Transceiver Station (BTS)
    - Base Station Controller (BSC)
    - The Transcoder and Rate Adaption Unit (TRAU)
  - 3G Radio Elements
    - Node B
    - Radio Network Controller
    - HSDPA / HSUPA Infrastructure
- WiFi and the wireless / 3G network

3G Radio Access
- CDMA in Operation
- Data Rates and Capacity (Spreading Factor and Processing Gain)
- Channels in 3G UMTS
- Planning a 3G Network
  - Traditional cell planning
  - CDMA Cellular Planning Principles
  - Soft Handover Regions and Cell Breathing
- Interference Effects
  - Contributors to Interference
  - Limitations
  - User Data Rates and the Number of Users
  - Reducing Interference / Increasing Capacity
  - Sectorisation

Smart Antennas
- Multi-carrier Cells
- Planning the Frequency Spectrum
- The Layered Architecture
- GSM Co-Planning and Use of Existing Sites
- HSPA, W-CDMA, EDGE and GSM Coverage Areas
- Planning Tools

Procedures – Bringing it all together
- Making Calls
- Receiving Calls
- Data Services
- Messaging
- Content Delivery
- Video
  - Calls
  - Clips
  - Streaming
- Roaming Scenarios
- Billing Processes

ANNEX
UMTS Release 5 - The IP Multimedia Subsystem (IMS)
- IMS Basics
- UMTS and IMS
- Why IMS
  - The IMS Market
  - Benefits to the Operator & the End User
  - IMS Technologies
- IMS Features
  - Multimedia Session Management
  - Mobility Management and Roaming
  - Service Execution and QoS
  - Third Party Service Support
- IMS Services
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