COURSE DESCRIPTION

INFORMA CERTIFIED MOBILE NETWORKS - TECHNOLOGIES & EVOLUTION

Format: Classroom
Duration: 5 Days
COURSE SUMMARY

- Highly focused and in-depth training from the experts - including relevant updates from Informa’s extensive research team
- PACE enabled training to maximise competency development - see inside
- Trainers and programme directors that are experts, industry experienced, and highly accomplished training professionals
- Training outcomes and competency development designed to meet your specific requirements

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- Discuss with confidence:
  1. The main principles and requirements of modern cellular networks, differentiating between circuit-switched and packet-switched requirements
  2. How networks need to change and evolve to meet current and future demands, including capacity, cost efficiency, and service capability
- List the main differences (capabilities, limitations, operation and deployment) between the various 3GPP radio schemes, focusing on GSM, GPRS, EDGE, 3G W-CDMA (UMTS), HSPA(+), LTE and LTE Advanced
- Present a diagrammatic representation of the architecture of a cellular system, highlighting the functionality of each network element - and show how the network evolves as the later 3GPP radio schemes are introduced
- Discuss the principles and operation of Roaming, Billing (including Prepaid), and Service Delivery (including the range of service delivery platforms that are available, IN / CAMEL Services, video, and Location-Based Services)
- Identify key technologies that provide the building blocks for the mobile network including Transmission, Switching, Signalling and Control, and Networking - stating clearly where the technologies are used
- Identify key technology frameworks that provide the foundation for technology transformation - such as IP, PCC, NFV and SDN, IMS, and On-Line Charging - and discuss with confidence and clarity their meaning, relevance and likely deployment scenarios
- Name three functions supported by each of OSS and BSS within modern networks, showing the relative position within the overall network infrastructure
- Understand how other radio access

“

“The course was very insightful and the lessons learnt from the course will be very relevant to the telecoms industry

— BL ETISALAT

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PRE-COURSE LEARNING  
(FOR PRIVATE PROGRAMMES ONLY)  

Telecoms Technologies Module  
Participants are asked to undertake a pre-course learning module to ensure they maximise the overall learning opportunity. The module is made up of a comprehensive work book, and a (short) recorded module. The module provides an excellent grounding on the Technologies - enabling participants to build their knowledge and confidence as effectively as possible during the classroom sessions.

On-Line Test - The module has an accompanying on-line test which will be scheduled prior to the classroom sessions. Participants need to achieve a “pass” as a pre-requisite for the face to face session (this is for private courses only - and subject to discussion).

D A Y 1  

SECTION 1 - FIXED BROADBAND TECHNOLOGIES  
- Fixed Network Access Evolution  
- The Local Loop - DSL Technologies  
- Bonding Vectoring & Omega DSL  
- Fibre and FTTx  
- Passive Optical Networks  
- GPON, EPON, PtP and Beyond  
- Ethernet in the First Mile (EFM)  
- Cable Technologies - DOCSIS, HFC  

Case Studies - Fixed Access Broadband  

SECTION 2 - RADIO AND CELLULAR PRINCIPLES  
- What is a cellular system?  
- A Telecommunications Network  
- Regulation and Standards  
- GSM family - The Global Standard  
- 3G and beyond  
- Radio characteristics  
  - Analogue vs Digital  
- Spectrum - a scarce resource  

SECTION 3 - 3GPP RADIO TECHNOLOGIES  
- The 3GPP Radio Network - General  
  - Radio Elements  
  - Base Station (BTS / NodeB / eNodeB)  
  - Controller (BSC / RNC)  
- Radio Technologies - Capabilities, Limitations, Operation  
  - GSM, GPRS and EDGE  
  - UMTS and W-CDMA  
  - HSPA/HSPA+  
  - LTE  
  - LTE Advanced  
- Complimentary technologies  
  - Wireless LAN (WiFi), WiMAX  
- Multi-Radio Access Technology (Multi-RAT) Network  

Certification Exercise  
This first exercise session focuses on overall network requirements and in particular in defining the performance and service support requirements.

D A Y 2  

SECTION 4 - 3GPP NETWORK INFRASTRUCTURE  
- The network – the basics  
  - Circuit or packet switched?  
- The Core Network  
  - Switches and routers  
  - Circuit Switched  
  - Packet Switched  
- Signalling – SS7  
- Controlling the network  
  - Mobility  
  - HLR, VLR, EIR and AuC  
- Services – IN and CAMEL  
- Messaging Systems  

SECTION 5 - NETWORK BUILDING BLOCKS  
- Transmission - Connecting the network together  
  - Use of Radio (including microwave links), Copper, and Fibre  
  - PDH (E1 Links), SDH, DWDM and Leased Lines  
- Transport and switching technologies  
  - IP, ATM, Frame Relay  
- Signalling and Control  
  - Mobile Signalling, SS7  
- Operations and maintenance  

Certification Exercise  
This session is used to analyze the implementation options for the evolving mobile network as a whole—including migration issues.
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**DAY 3**

**SECTION 7 - SIGNALLING SYSTEM NUMBER 7**
- SS7 as the Network Signalling System
- Signalling Scenarios
  - For Call Control
  - For Mobility – GSM and UMTS
  - Intelligent Networks and CAMEL
- The SS7 Protocol Architecture
- The SS7 Physical Architecture
- Example Call Scenarios
- Use of ISUP
- Example Procedures for 3GPP Networks
- SS7 in Support Of CAMEL / Intelligent Networks
- SS7 and IP Protocols
- The Evolving Signalling Network

**SECTION 8 - OVERALL PROCEDURES AND TECHNIQUES**
- Identities and Addressing
- Idle mode procedures
- Connected mode procedures
- Handover
- Location services (LCS)
- Security
- UMTS-GSM intersystem operation
- Streaming and Content Delivery
- Access to Content
- Access to Messaging Servers

**SECTION 9 - IP IN TELECOMS & IT TRANSFORMATION**
- IP Technology and Concepts Explained
- IP Functionality, Operation and Addressing
- IP In Telecoms / IP in the Mobile Network
- Delivering Services over IP
- The IP Multimedia Subsystem
- Quality of Service Issues and MPLS
- The Role of IT Transformation
- Efficiency and IP
- NFV and SDN

**Certification Exercise**
This session is used to analyze best practice deployment, procedures and systems for advanced networks.

**DAY 4**

**SECTION 10 - THE EVOLVED PACKET CORE (EPC)**
- Towards All IP Networks
- Introduction to SAE and the EPC
- Towards the all-IP network - Upgrade paths to LTE & LTE terminology
- Evolution to 3GPP Release 10
- The Evolved Packet Core (EPC)
  - Architecture & Element Functionality
  - Interfaces
  - Reference Points
  - Protocols
- EPS Bearers & Bearer Types
- QoS Mechanisms
- Interworking Mechanisms
  - Interoperability
  - Interworking with 2 & 3G Access
  - Trusted and non-trusted 3GPP accesses
- EPC Procedures
- EPC & the IP Multimedia Subsystem

**SECTION 12 - SUPPORTING SYSTEMS**
- The Operational Support System (OSS) and Business Support System (BSS)
- Billing Systems in the Mobile Environment
- Operating Effectively
- Business Transformation

**Certification Exercise**
This session is used to analyze the implementation options for the Next Generation Core Network and Evolved Packet Core, including migration issues and time lines.

**DAY 5**

**SECTION 13 - ADVANCED BILLING FOR NEXT GENERATION NETWORKS**
- Next Generation Billing Overview
- Legacy billing Systems
- Next-Generation Billing systems
  - Drivers
  - Functions
- Online & Offline charging
  - Features
  - Procedures
- Real Time Billing
- Converged Billing
- Revenue Assurance
- Customer Data
- Migration Issues
- eTOM model and billing
SECTION 14 - POLICY CONTROL AND CHARGING (PCC)

- PCC Overview
- PCC Architecture
- PCC functional elements and reference points
- PCC and the billing system
- Offline and online charging functionalities
- The service data flow
- SDF charging flow examples
- PCC rules and how they are used
- Policy 2: evolution towards the Sy interface
- Roaming and PCC
- Credit control & management triggers
- The 'Termination' action
- IP Connectivity Access Networks
- Example message flows

Certification Exercise

Overall service delivery is now brought into the exercise plan, with a focus on effective and efficient service delivery architectures and mechanisms (including billing, PCC and IP services) that maximise capability, scalability, flexibility and control.

Exercise Wrap-Up:

The final session is used to review the exercises and discussions and build on previous sections

Reviewing the operator / network model, including:
- Infrastructure
  - Architecture
  - Evolution
- Services and Applications - Strategies
- Data access mechanisms
- Content
- Evolution Strategies
OUR TRAINING SERVICES

TELECOMS ACADEMY STRUCTURE

Our training programmes are delivered worldwide as part of the training and development plans of many operators, vendors, and service providers. The programmes cover a wide range of competency development requirements.

To ensure we meet the training needs of the industry as effectively as possible, we operate three schools:

School of Telecoms Management
Business training tailored to the telecoms industry, ranging from the intensive 5-day Telecoms Mini MBA to specialist leadership and marketing training.

School of Advanced Communication Technologies
Covering a multitude of technologies, these courses range from overviews aimed at nontechnical staff to in-depth engineering training.

Distance Learning
Our comprehensive suite of Distance Learning programmes provide an excellent opportunity to expand knowledge and build confidence.

PACE ENABLED TRAINING

Our programmes are PACE Enabled – a training method that optimises both training value and student engagement. It delivers highly efficient competency development that is focused squarely on practical application in the work place. It is simple in concept and comprises four key elements;

- Preparation – Pre-course preparation in order to "hit the ground running"
- Application – Applied Learning that focuses on practical application in order to maximise both training value
- Consolidation – Post-course continuing competency development, access to resources and on-going support
- Experience – An outstanding end-to-end training experience designed to develop competences as effectively as possible

OUR TRAINERS

We only use trainers and programme directors that satisfy the following three criteria:

- Experts in their field
- High level of Industry Experience
- Expert facilitators and training professionals.

All our trainers have undergone a rigorous election process and are subject to continuous monitoring and evaluation. Each trainer is accredited for specific courses or topic areas. Whether engineers or business experts, all our trainers are required to continue their own development within their specialist areas, and to broaden their Industry view of trends, best practice and technology.

This is achieved by our on-going work with many tier 1 operators and vendors, and by full exposure to Ovum research and KNect365 TMT worldwide events.

UNIVERSITY ACCREDITATION

Some of our programmes have been accredited by the University of Derby Corporate; a UK-based university highly acclaimed in the area of employer engagement. They are at the forefront of the drive to integrate highly focused industry-led training with the academic rigor and quality control of university-based education. Our comprehensive Advanced Telecoms Management Series have been accredited Post-Graduate Level, with our extensive suite of Distance Learning at Undergraduate Level)

We would be happy to discuss extending accreditation to tailored ATMS or programmes based on our Distance Learning modules. Although accreditation is specific to these programmes, the work we do with the University of Derby enable us to develop and apply best practice across our portfolio.

CUSTOMISED IN-HOUSE TRAINING

Telecoms Academy has worked with countless companies to deliver customised training programmes. We take time to understand your requirements, you'll work with our specialist training team to ensure that we deliver your perfect training programme for your business.

A customised training programme from Telecoms Academy ensures you get a course that precisely matches your organisation's needs, presented by a first-rate training organisation, with access to all the latest industry research and analysis.

Why choose in-house training from Telecoms Academy?

- Content can be customised to focus on the issues you want – work with us to develop the training course to match the exact needs.
- Unique industry research – from Ovum's team of industry leading analysts
- Expert trainers – our team of versatile trainers have the knowledge and experience to deliver a highly effective learning experience
- The most efficient way to train your staff – at the time and location to minimise disruption
- Flexible delivery options – with a range of instructor led, distance learning and virtual classroom formats available you can build a blended solution to maximise training effectiveness over the long term
- Pre and post course assessment – can be included in programmes to measure competencies and check on the required progress.

Contact us to discuss how we can build your perfect programme.