COURSE DESCRIPTION

W-CDMA AND UMTS SYSTEM OVERVIEW
COURSE SUMMARY

HIGHLIGHTS

- Excellent technical grounding in UMTS networks - W-CDMA, Access, Core & Service Delivery
- 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

Here’s what past Telecoms Academy delegates have said:

“The programme was well structured and the instructional method were excellent.”

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COURSE SUMMARY

Designed to give a good overall understanding of the Universal Mobile Telecommunication System (UMTS), this course establishes the need for a new generation of mobile network before explaining, in detail, how UMTS proposes to meet those requirements.

The service aspects, architecture, protocols, and implementation strategies are all presented in a clear, concise format. This, together with a thorough grounding of the Wideband Code Division Multiple Access (W-CDMA) scheme used in UMTS, the structure of the Air Interface, the associated radio planning issues and migration strategies, will ensure the delegate is equipped with a good all round view of UMTS.

PRE-REQUISITES

A basic understanding of GSM architecture and procedures would be an advantage, but not essential.

COURSE CONTENTS

- The need for 3rd Generation Systems
- UMTS Services and Applications
- UMTS Architecture
- Core Network Architecture and Protocols
- W-CDMA Applied to UMTS
- The UMTS Air Interface Channels and Protocols
- The UMTS Terrestrial Radio Access Network (UTRAN)
- Procedures
- Radio Planning Issues
- Evolutionary Strategies

OUTCOMES & COMPETENCY DEVELOPMENT

Participants will develop or be able to:

- State the main principles driving the development and introduction of the next generation of mobile networks, and how these are addressed by UMTS
- Describe the overall UMTS architecture, explaining the role of the User Equipment, UTRAN, and Core Network
- Describe the function and operation of each UMTS network element
- Relate protocols to the relevant interfaces, describing the basic requirements and principles associated with each interface
- Explain the basic operation of the air interface, describing the capabilities, advantages, requirements and operation of the W-CDMA system applied to UMTS, together with the basic protocol structure and resulting impact on services
- State the transport protocols to be adopted at each point in the network and appreciate the reasons why those protocols have been chosen for standardisation
- Recognise and follow UMTS basic procedures, relating each phase in a procedure to the relevant UMTS or transport network protocol operation
- Discuss with confidence, some of the issues related to planning UMTS radio networks. Appreciate, also, the possible migration strategies towards the next generation of mobile network

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THE NEED FOR 3RD GENERATION SYSTEMS
- Modern mobile networks – an overview
- Services provided by GSM/GPRS/EDGE/WAP
- Future perceived service requirements
- The requirement for the next generation of networks
- The ITU requirement for IMT 2000
- ETSI, 3GPP and UMTS standardisation

UMTS SERVICES AND APPLICATIONS
- UMTS Teleservices and Bearer Services
- Quality of Service Classes
- The Virtual Home Environment Concept
- Mobility Services
- Security, including encryption and authentication
- Multimedia Applications
- Use of WAP, MeXE, xTML etc
- UMTS Services and Applications
- Requirements of the User Equipment
- Mobile Equipment
- UMTS Subscriber Identity Module (USIM)

UMTS ARCHITECTURE
- Assumptions for Network Standardisation
- Overall UMTS Architecture
- Modes of Access – Overall Characteristics (FDD, TDD, ODMA)
- Elements of the UE
- Elements of the UTRAN
- Elements of the Core Network
- Interfacing With Other Systems

CORE NETWORK ARCHITECTURE AND PROTOCOLS
- Requirements for Release 99 – An Overview

THE CIRCUIT SWITCHED AND PACKET SWITCHED DOMAINS
- Circuit Switched Domain
- Packet Switched Domain
- Core Network to UE Protocols
- The purpose of IN and CAMEL – Brief Overview (accessing services in home network)
- The Use of the Internet Protocol
- Transport Protocols
- Transmission in the Core Network
- Requirements for Release 2000 – An Overview

WCDMA APPLIED TO UMTS
- Access Methods – Frequency Division Duplex and Time Division Duplex CDMA
- Direct Sequence CDMA – Operation (Spreading / Despreading)
- Spreading Factor and Capacity
- Channelisation Codes for UMTS
- Scrambling Codes for UMTS
- Use of the Rake Receiver
- The Near-Far Effect
- Fast Power Control
- Soft Handover
- Cell Breathing
- Beam Forming Antennas and Multi-User Detection

THE UMTS AIR INTERFACE CHANNELS AND PROTOCOLS
- The Basic Structure
- The General Protocol Model (Non-Access and Access Stratum/User and Control Planes)
- Non-Access Protocols
- Access Protocols – Overall Aims
- Radio Resources Control (RRC)
- Radio Link Control (RLC) and Media Access Control (MAC)
- The Channels (Logical, Transport and Physical)
- TDD, FDD and ODMA Operation
- Coding and Channels in FDD & TDD
- Mapping Information through The Channels

THE UMTS TERRESTRIAL RADIO ACCESS NETWORK (UTRAN)
- Requirements Of The UTRAN
- UTRAN Nodes And Their Functionality
- General Interface Structure
- The UTRAN Interfaces
- Radio Resource Control (RRC) In The UTRAN
- Transfer Of Logical and Transport Channels Through The UTRAN
- Connection Establishment
- Soft Handover and Macro Diversity
- Transmission within The UTRAN

JOINT PROCEDURES
- Attach/Detach
- Location And Routing Area Updates
- Power Control
- Soft Handover
- Hard Handover
- Circuit Switched Procedures
- Call Set Up
- CAMEL Interactions
- Packet Switched Procedures
- Context Establishment
- Packet Transfer
- CAMEL Interactions

RADIO PLANNING ISSUES
- Dimensioning
- Capacity and Coverage Planning
- Interference Issues
- Optimising the Radio Network
- GSM/UMTS Co-planning
- EDGE/UMTS Co-planning

EVOLUTIONARY STRATEGIES
- UMTS – The Fully Evolved Network
- Identifying The Areas For Evolution
- Options For The Air Interface And Radio Access Network
- Options For The Core Network
- Interworking Issues
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.

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, an 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 postgraduate 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.