**UMTS(WCDMA)**

CH5102 UMTS(WCDMA) Fundamentals

Duration: 1 day

Prerequisite Courses:
Wireless Fundamental
GSM Solution Overview

Course Description
GSM/GPRS operators worldwide continue to look to UMTS(WCDMA) to increase their system capacity and enable multimedia services. UMTS(WCDMA) and its evolution – HSDPA and HSUPA in the radio network and IMS in the core network – are capable of increasing system capacity and offering a rich multimedia experience to the users. This course covers all the key aspects of the UMTS(WCDMA): UMTS(WCDMA) architecture, Core Network, UMTS(WCDMA) Terrestrial Radio Access Network (UTRAN) and evolution of UMTS(WCDMA).

Intended Audience
This course is for technical staff involved in the management, development and deployment of UMTS(WCDMA) networks and engineers requiring a comprehensive explanation of UMTS(WCDMA) operation.

Key Topics
- UMTS(WCDMA) Overview
- UMTS(WCDMA) Core Network
- UMTS(WCDMA) Technology Essentials
- UMTS(WCDMA) Terrestrial Radio Access Network (UTRAN)
- System Scenarios
- HSDPA Enhancements
- UMTS(WCDMA) Deployment
- Evolution of UMTS(WCDMA)

Objectives
- Discuss the driving forces, requirements and goals of UMTS(WCDMA)
- Describe the building blocks that will be used to construct a UMTS(WCDMA) network
- Discuss the key aspects of the radio technology
- Explain the Radio Access Network and the core network
- Discuss the services available in UMTS(WCDMA) networks
- Explain how a voice call is established and maintained
- Describe how a packet data session is established
- Highlight the key aspects of HSDPA
- Explain the evolution from GSM/GPRS to UMTS(WCDMA) to HSDPA

Prerequisite Skills
A good knowledge of current data communications systems, wireless communications systems.

CH5103 Advanced UMTS(WCDMA)

Duration: 3 days

Prerequisite Courses:
UMTS(WCDMA) Fundamentals

Course Description
UMTS(WCDMA) is one of the 3rd generation wireless systems. UMTS(WCDMA) is designed to increase a subscriber’s data rates and system capacity.

This course offers a technical overview of UMTS(WCDMA), focusing on the UMTS(WCDMA) air interface, radio networks and core networks. It covers the network architecture, components and basic operations of UMTS(WCDMA) networks. In addition, this course explores the details of the UMTS(WCDMA) air interface technology and its ability to support multiple subscribers simultaneously. Aspects of CDMA technology pertaining to the UMTS(WCDMA) air interface including coding, modulation, spreading, scrambling, handovers and power control mechanisms are clearly explained. This course then focuses on Circuit Switched and Packet Switched Core Networks. The key concepts in the course are tied together with several system scenarios to provide insight into location management, mobility management and handovers.

Intended Audience
This course is intended to provide a technical overview of UMTS(WCDMA). It is appropriate for personnel in planning, deployment, RF engineering, network performance, and network operations.

Key Topics
- UMTS(WCDMA)Overview
- UMTS(WCDMA) Core Network Architecture
- UMTS(WCDMA) Radio Network
- UTRA Channels and Protocols
- Circuit-Switched Scenarios
- Packet-Switched Scenarios
- System Scenarios
- Evolution of UMTS(WCDMA)

Objectives
- Identify the driving forces, requirements and goals of UMTS(WCDMA)
- List the capabilities of UMTS(WCDMA)
- Explain the evolution from GSM/GPRS/EDGE networks
- Sketch the network architecture and identify the network nodes and interfaces
- Describe how functions such as mobility management and handovers are performed in UMTS(WCDMA)
- Step through the setup of voice and data calls in UMTS(WCDMA) networks
- Identify the UMTS(WCDMA)-GSM interworking scenarios
- Discuss the features and benefits of HSDPA and HSUPA
- Discuss the features and benefits of HSPA+
- Discuss the features and benefits of LTE

**Prerequisite Skills**
A good knowledge of current data communications systems, wireless communications systems.

**CH5104 UMTS(WCDMA) Air Interface**

**Duration:** 2 days

**Prerequisite Courses:**
UMTS(WCDMA) Fundamentals

**Course Description**
This course covers all the key aspects of the UMTS(WCDMA) Terrestrial Radio Access Network (UTRAN) – FDD mode. It provides details of the UTRAN architecture, protocols, operations and services. Beginning with a basic call, the student is introduced to the signaling protocols, followed by a detailed description of the physical layer functions. Next, a packet data scenario introduces protocols (e.g., MAC, RLC), transport format sets and the basics of radio resource management. Once this foundation has been laid, the more complex topics of concurrent service management and bandwidth on demand are discussed. This is followed by a discussion of operations, Quality of Service (QoS), and mobility management within the UTRAN. The final chapters include an in-depth discussion of framing protocols, synchronization procedures and other physical layer procedures. The approach of using end-to-end scenarios shows the application of concepts and the theory behind the concepts.

**Intended Audience**
This course is primarily intended for a technical audience, including those in system design, systems test, systems engineering, network engineering, product support, operations, RF engineering, UTRAN architecture and strategy and anyone seeking a more in depth understanding of the UMTS(WCDMA) RAN.

**Key Topics**
- Introduction
- UMTS(WCDMA) Channels Overview
- Physical Layer Functions
- Physical Layer Operations
- Voice Call Setup
- Data Session Setup
- Service Reconfiguration
- UTRAN Mobility Management
Inter-System Scenarios
- RF Design, Analysis & Optimization
- HSDPA Essentials

Objectives
- Identify the role of the UTRAN in delivering UMTS(WCDMA) services
- List the components of the UTRAN and their roles and responsibilities
- Describe the roles of control plane protocols (RANAP, RNSAP, NBAP, and RRC)
- Specify the physical layer functions and procedures managed by the UTRAN
- Explain the functions and procedures of logical, transport and physical channels
- Describe how Quality of Service is managed and delivered
- Highlight the procedures that support intra- and inter-UTRAN mobility
- Describe how to apply all of the concepts to create a UMTS(WCDMA)Terrestrial Radio Access Network
- Explain the evolution of UMTS(WCDMA) to HSDPA/HSUPA

Prerequisite Skills
A good knowledge of current wireless communications systems.

CH5105 UMTS(WCDMA) Planning and Optimization

Duration: 2 day

Prerequisite Courses:
UMTS(WCDMA) Fundamentals
UMTS(WCDMA) Air Interface

Course Description
UMTS(WCDMA) is one of the 3rd generation wireless systems. UMTS(WCDMA) is designed to increase a subscriber’s data rates and system capacity. This course covers essential concepts of UMTS(WCDMA) Cell Planning, in addition to the describing the issues affecting the practical optimization of UMTS(WCDMA) networks.

Intended Audience
This course is primarily intended for Radio and Network Planners requiring a comprehensive explanation of UMTS(WCDMA) Planning and Optimization. Technical staff involved in the deployment of UMTS(WCDMA) networks.

Key Topics
- Radio Planning and Deployment Process
- Traffic and QoS Considerations
- UMTS(WCDMA) Planning
- Antenna Selection
- UMTS(WCDMA) Site Location and Integration
- Planning and Optimizing Handovers
- Optimizing UMTS(WCDMA)

**Objectives**
- Describe the UMTS(WCDMA) Deployment Process
- Be familiar with the UMTS(WCDMA) Traffic and QoS Consideration
- Be familiar with Antenna Selection & Site Location and Integration
- Define key features of UMTS(WCDMA) Planning process
- Describe Optimization of UMTS(WCDMA)

**Prerequisite Skills**
A good knowledge of current wireless communications systems.