



**UMTS Fundamental**

**2 Hr. 19 Min.**



**LEARNING OBJECTIVE:**

Upon completing the course, the participant will be able to:

- Understand the need of 3G evolution
- Understand the UMTS Architecture, Roaming Scenarios and Interworking
- Dig deep into the Basics of WCDMA
- Examine the Radio Resource Management

**COURSE OBJECTIVE:**

This course covers the basics of UMTS radio communication. The student will get in depth understanding of UMTS Network Architecture, interfaces, Protocols. we will also discuss air Interface and UMTS Core Network. This course is designed for both students as well as working professionals who want to learn UMTS (3G) Technology.

**WHO SHOULD ATTEND:**

This course is designed to provide a general overview for strategic or technical managers, consultants, communications professionals, network professionals and others who plan to work in LTE wireless network.

**TARGET AUDIENCE:**

RF Engineers, Drive Test Engineers, Any one who wants to gain knowledge in 3G Technology.

**INSTRUCTIONAL METHODS:**

Lectures in Classroom, Virtual Classroom trainings, discussion, Questions & Answers. All participants will also receive comprehensive course materials.

**COURSE OUTLINE:**

**1. UMTS Fundamental**

- 1.1 Overview and objectives**
- 1.2 What is UMTS?**
- 1.3 3G (Third Generation)**
- 1.4 IMT 2000 Roadmap**

**1.5 IMT 2000 Objectives**

- 1.6 Research and Proposal**
- 1.7 Standardization**
- 1.8 Harmonization**
- 1.9 World wide Spectrum Allocation for IMT 2000**





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- 1.8 European Frequency Allocations
- 1.9 Network Services : An Introduction
- 1.10 QoS Classification
- 1.11 UMTS QoS Service class
- 1.12 QoS parameters
- 1.13 Information Transfer
- 1.14 QoS Attributes
- 1.15 QoS Differentiation

**2. UMTS Architecture**

- 2.1 Overview & Objectives
- 2.2 User Equipment Domain
- 2.3 Infrastructure Domain
- 2.4 UMTS Architecture
- 2.5 UMTS RAN Elements
- 2.6 UMTS CN Elements
- 2.7 UMTS CN Element MSC and GMSC
- 2.8 UMTS CN Elements PS Domain
- 2.9 UTRAN
- 2.10 RNC Roles : CRNC/ SRNC/ DRNC
- 2.11 UMTS Release 4 Architecture
- 2.12 Media Gateway
- 2.13 Mobile Switching Centre server
- 2.14 WCDMA Interfaces

**3. WCDMA Basics**

- 3.1 Overview & Objectives
- 3.2 Multiple Access
- 3.3 UMTS Air Interface Technology
- 3.4 WCDMA Characteristics
- 3.5 UMTS and GSM Network planning
- 3.6 Block Diagram of WCDMA System
- 3.7 WCDMA Principle – Bits, Chips & Symbols

- 3.8 Spreading and despreading Signal
- 3.9 Desired Signal and Other user Signal
- 3.10 Signal Transmission and reception
- 3.11 CDMA – A Spread Spectrum Technique
- 3.12 Channelization Code
- 3.13 Processing Gain
- 3.14 Scrambling
- 3.15 Channelization Code vs Scrambling Code
- 3.16 Multipath Propagation
- 3.17 Rake Receiver Architecture

**4. Radio Resource Management**

- 4.1 Overview & Objectives
- 4.2 RRC Connection States
- 4.3 Handover
- 4.4 Power Control
- 4.5 Admission Control
- 4.6 Packet Scheduler
- 4.7 Load Control

**5. HSPA Basics**

- 3.1 Overview & Objectives
- 3.2 Release 99 (UMTS) inefficiencies
- 3.3 Applications benefitting from HSPA
- 3.4 HSPA evolution
- 3.5 HSPA Architectural Evolution
- 3.6 HSDPA Basic Principles
- 3.7 Shared Channel Transmission
- 3.8 Multi- code operation
- 3.9 Dynamic Power allocation
- 3.10 Fast Hybrid automatic Repeat
- 3.11 Power control and Link Adaptation





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- 3.12 Adaptation modulation coding
- 3.13 overview of HSUPA
- 3.14 HSUPA : Comparison with HSDPA
- 3.15 HSUPA Scheduling

**Evaluation and feedback of the participants**

Maximum number of participants: 15

Duration: 2 Hr. 19 Min.



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