



## THE AFRICAN ADVANCED LEVEL TELECOMMUNICATIINS INSTITUTE (AFRALTI)

**COURSE TITLE: 3G NETWORKS & APPLICATIONS**

**DURATION: 5 Days**

### **Course Suitability:**

This course would benefit anyone looking for a thorough understanding in 3G and 3.5G technologies including technology choices and migration paths. A basic understanding of telecommunications and in particular alluter technology would be an advantage.

### **Course Overview:**

3G systems and services are making a significant impact on the mobile communications industry by providing an enhanced user experience. This course lays out the basics of 1G and 2G wireless components, architecture, and moves on to explain the steps necessary to successfully build and operate a 3G wireless network.

In this course you'll find information on wireless system design, high speed voice and data transmission, internetworking protocols, and 4G convergence. You will also learn about 3G technologies such as W-CDMA/UMTS (HSPDA), CDMA 2000, IP and lms, as well as services and applications.

### **Course Objectives:**

1. Discover the various 3G protocols which are defined in the IMT – 2000 standard.
2. Interoperate between wireless 1G, 2G, 2.5G and 3G platforms and devices.
3. Understand the air interface, network architecture, and protocols for WCDMA/UMTS (HSPDA), CDMA 2000.
4. Learn the details behind SIP and H.323 VoIP standards.
5. Intergrate WiFi, WiMAX, WiMAN, Bluetooth and cable systems.
6. Create and refine RF, WCDMA, CDMA 2000 system design plans.
7. Migrate existing platforms towards an all – IP networks.
8. Identify services and applications that will be supported by 3G.

### **Course Contents:**

1. **Introduction to the fundamentals of mobile communications**
  - The phenomenal growth of mobile communications
  - A little history

- Mobile communications Fundamentals
  - Wireless Migration Options
2. **First – Generation (1G) Analog**
    - 1G Systems
    - General 1G System Architecture
    - ISBTS (all site configuration)
    - Frequency Reuse
    - Spectrum Allocation
    - Channel Band Plan
    - 1G Systems
  3. **Second – Generation (2G)**
    - Enhancements over 1G System
    - Integration with existing 1G Systems
    - GSM
  4. **Third Generation (3G) Overview**
    - Introduction
    - UMTS
    - UMTS Services
    - The UMTS Air Interfaces
    - Overview of 3G PP Release 1,4,5
    - Overview of CDMA 2000
    - TD-CDMA
  5. **The Evolution Generation (2.5G)**
    - What is 2.5G?
    - Technology Platforms
    - GPRS
    - EDGE
    - GSM/GPRS/EDGE Traffic Dimensioning
    - HSPDA
    - WAP
    - SMS
    - Migration Path from 2G to 2.5G to 3G
  6. **Universal Mobile Telecommunications Services (UMTS)**
    - UMTS Basics
    - The WCDMA Air Interface
    - The UTRAN Architecture
    - High Speed Packet Data
    - Hand over
    - UMTS Core Network Evolution
  7. **TD - CDMA**
    - Generic TD – CDMA Architecture
    - Core Network
    - Radio Network
    - RAN Traffic Planning
    - Handover

## **8. VoIP**

- Why VoIP?
- The Basics of IP Transport
- VoIP Challenges
- H.323
- The session Initiation Protocol (SIP)
- The MEGACO Protocol
- VoIP and SS7
- VoIP QoS

## **9. Broadband**

- WiFi (802.11)
  - 802.11b
  - 802.11g
  - 802.11a
- 802.16
  - 802.16
  - 802.16d
  - 802.16e
- Bluetooth
- Cable System

## **10. 3G System RF Design Considerations**

- RF System Design Procedures
- Methodology
- Link Budget
- Propagation Models
- Tower-Top Amplifiers
- RF Design Guidelines
- Traffic Projections
- Cell-Site Design
- RF Design Report

## **11. Network Design Considerations**

- Traffic Forecasts
- Network Node Dimensioning
- Interface Design and Transmission Network considerations
- Placement of Network Nodes and overall Network Topology

## **12. Antenna System Selection**

- Base Station Antennas
- Performance Criteria
- Diversity
- Cross Pole Antennas
- Dual – Pole Antenna
- MIMO

## **13. UMTS System Design**

- ❑ Network Design Principles
- ❑ RF Coverage Analysis
- ❑ RF Capacity Analysis
- ❑ Design of Radio Access Network
- ❑ UMTS overlaid on GSM
- ❑ HSPDA/HSUPA

**14. 4G and Beyond**

- ❑ Technology path
- ❑ Convergent Devices
- ❑ Advanced Wireless Services (AWS)
- ❑ Multimedia (Mobile TV)

**Register Now!!**