



AFRICAN ADVANCED LEVEL TELECOMMUNICATIONS INSTITUTE (AFRALTI)

WORKSHOP OUTLINE

- Title:** INTRODUCTION TO GSM, GPRS, 3G and 4G
- Dates:** (To be Advised)
- Venue:** (To be Advised)
- Cost:** Participants ex AFRALTI Member States - US\$ 1,000.00 per person
Participants ex Non Member States - US\$ 1,200.00 per person
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TARGET AUDIENCE:

This course is designed for Telecommunication Engineers, Managers and Support Engineers and Technicians within the telecommunications industry and those who require the necessary understanding of the evolving mobile and cellular communication.

DESCRIPTION:

3G & 4G mobile systems offer exciting new wireless packet capabilities, as well as enhanced cost effectiveness for traditional and enhanced voice services. The improved capacities for voice services supports the business case for deployment of 3G systems now, while the new wireless packet capabilities meet a growing demand for wireless internet services and convergence of fixed and mobile networks.

This course will introduce the second generation (2G) mobile communication service (GSM) concepts and the evolution path towards 4G. The course will also introduce the intermediate technologies, ie 2.5G (GPRS), 2.75G (EDGE) and 3G (UMTS) which are paving the way to the fourth generation.

WORKSHOP OBJECTIVES:

- ✓ Review the concepts, techniques and terminology as applied to the various generations of mobile and cellular networks.
- ✓ Discuss the need for the evolution path towards 4G and the challenges that accompany it.
- ✓ Understand the concept of 4G and have a wider view of the 4G mobile communications system.
- ✓ Examine the triple-play and quad-play service packages in 4G IP packet switched network.

WORKSHOP TOPICS:

1. Introduction to GSM

- 1.1 History of Wireless Communications.
- 1.2 Motivation for GSM
- 1.3 Current GSM status and the evolution path for GSM

2. Radio Propagation Basics

- 2.1 Frequency and wavelength
- 2.2 Spectrum Management and allocation
- 2.3 Radio propagation: Free space, Reflection, Refraction and Diffraction
- 2.4 Characteristics of a radio signal
- 2.5 Space Diversity

3. 2G GSM

- 3.1 GSM network components and their functionality
- 3.2 GSM overall system planning and operation
- 3.3 GSM Voice Services
- 3.4 Mobile Data Services
- 3.5 Signalling in GSM
- 3.6 GSM Air Interface
- 3.7 Interference

4. 2.5G – GPRS

- 4.1 GPRS Principles
- 4.2 GPRS Services
- 4.3 GPRS Operation
- 4.4 GPRS Integration with GSM Networks
- 4.5 GPRS Architecture
- 4.6 QoS Issues
- 4.7 GPRS and Wireless Application Protocol (WAP)

4.8 Planning GPRS Networks

5. 2.75G – EDGE

- 5.1 Limitations of GPRS
- 5.2 GRRS versus HSC SD
- 5.3 Principles of EDGE
- 5.4 EDGE as a 3G Network Technology
- 5.5 VoIP over EDGE

6. 3G WCDMA UMTS

- 6.1 CDMA Radio Transmission Technologies
- 6.2 CDMA 2000
- 6.3 WCDMA
- 6.4 Architecture
- 6.5 IP Fundamentals

7. 4G

- 7.1 What is 4G
 - The way to the 4G
 - 4G Characteristics
 - Ultra wide bank Radio
 - LTE
 - Packet Switched/IP Multimedia

7.2 Features of 4G Wireless System

- Adaptive Modulation and Coding
- Global Mobility
- Service Portability
- QoS Requirements

7.3 What to expect in 4G

- New Services
- What is 4G Mobile Service?
- Expected 4G services
- Media rich Applications
- The Wireless World Beyond Third Generation
- 4G Networks Overlay
- Location Services in 4G Networks

7.4 Challenges in 4G

- High frequency reuse
- Security
- Variable QoS services
- Seamless roaming

7.5 Migration from 3G to 4G

FACILITATOR BRIEF:

Mr. Mohamed Noorani is an international expert in telecommunications, data communications and networking and has been actively involved in the industry since 1981. He holds a Bachelors Degree in Electrical Engineering and is a licensed and registered Engineer in his home country, Kenya. He is also a Cisco Certified Network Associate and a Microsoft Certified Systems Engineer.

Mr. Noorani has taught telecommunications technology and data communications training seminars to wide acclaim across Africa since 1991, and has a broad experience working as an engineer in the telecommunications industry.

He worked for Kenya telecommunications as a Project Planning Engineer for ten years on projects including Digital Voice and Data Networks, on Signalling System No. 7, X 25 Packet Switching Network for the Kenya Data Network and many other projects in capacities ranging from detailed Project Design and Implementation to Project Leader.

Currently, Mr. Noorani is the Head of Network Planning and Management at the African Advanced Level Telecommunications Institute (AFRALTI) specialising in developing and conducting training programs in Broadband Wireless technologies, CCS No 7, VSAT Networks, Network Planning, Telecommunications Network Management, IP networks and Convergence, GSM Wireless Technologies such as CDMA and WiMAX, Circuit, Packet and Ethernet switching, VoIP, Next Generation Networks and IP networking over Satellite.

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