



## Who Should Attend?

This course is designed for Telecom employees who need to know about signalling in UMTS Air Interface and Radio Access Network.

## Course Scope

1. UMTS Radio Introduction.
  - Overview.
  - Radio Access Evolution.
  - UMTS Network Architecture.
  - UTRAN Architecture.
  - Radio Access Methods: FDMA, TDMA, CDMA.
  - WCDMA Transmitter
    - Spreading,
    - Channelisation,
    - Scrambling.
  - Power Control and Handover.
  - Transport and Logical Channels.
  - Radio Interface Protocols Structure.
  - UTRAN Protocols Introduction.
2. Radio Interface Protocols: RRC, RLC, MAC.
  - Radio Resource Control (RRC).
    - Interactions between Protocols,
    - Protocol Termination,
    - Model of RRC,
    - RRC States,
    - RRC Procedures,
    - RRC Connection Management,
    - Radio Bearer Control,
    - Measurement,
    - RRC Connection Mobility.
  - Radio Link Control (RLC).
    - Services,
    - Functions,
    - Transparent Mode,
    - Unacknowledged Mode,
    - Acknowledged Mode,
    - PDU Formats.
  - Medium Access Control (MAC).
    - Functions,
    - Transport Format,
    - MAC Architecture,
    - PDU Format.



## 3. UTRAN Protocols: NBAP, RNSAP, RANAP.

- UTRAN Architecture.
- Radio Network Signalling Protocols.
- UTRAN Interface Protocol Layers
  - Node-B Application Part (NBAP),
  - I<sub>ub</sub> Interface Protocol Structure,
  - NBAP Functions and Procedures.
- Radio Network Subsystem Application Part (RNSAP).
  - I<sub>ur</sub> Interface Protocol Structure,
  - RNSAP Functions and Procedures.
- Radio Access Network Application Part (RANAP).
  - I<sub>u</sub> Interface Protocol Architecture,
  - RANAP Procedures.

## Course Objectives

This course explains the main procedures of UMTS RAN Signalling and their importance for the effectiveness and quality of specific Telecom services.

## Prerequisites

None. Basic knowledge of UMTS and air interface recommended.

## Training Structure

Five-day training divided into logical sessions.

## Methodology

Instructor-led training. Theory, procedures, and logs.