

# WiMAX for Broadband Wireless Access

## Course Description

This course will provide the student with broad knowledge on current WiMAX and 802.16 standards, trends, issues and technologies. It compares BWA technologies to WiMAX and studies issues regarding WiMAX as a Broadband Wireless Access Technology. Technoeconomics of WiMAX as a BWA solution is also included, as well as the principles of network planning together with planning examples

**Duration:** 3 days

## Course Outline

1. **Overview of Broadband Wireless Markets, Applications, and Requirements**
  - Architecture of a broadband wireless access network, Line of Sight vs Non-Line-of-Sight
  - Topologies and Mobility, Advanced Antenna Systems, Quality of Service,
  - WiMAX Compared with other BWA technologies, techno-economics of WiMAX
  - The role of the WiMAX Forum™
2. **802.16 High-level Architecture**
  - Physical Architecture, Protocol architecture
  - Time Slots and Time Division Multiple Access
  - Which Implementation Options are most common?
3. **802.16 Physical Layer Options**
  - Why are there so many PHY options?
  - Single-carrier physical layer for operation between 2 and 11 GHz (802.16a)
  - Multipath: Why multi-carrier approaches?
  - Orthogonal Frequency Division Multiplexing (OFDM)
4. **802.16 Medium Access Control**
  - Steps for Joining an 802.16 network
  - Addressing and Encapsulation
  - Bandwidth Requests and Allocation, Automatic repeat request (ARQ)
  - Security, Quality of Service Scheduling Rules
  - Multi-carrier OFDM for 2-to-11 GHz Licensed Operation
5. **The Mobile Broadband Wireless Access: 802.16e**
  - Multi-carrier OFDM for 2-to-11 GHz Unlicensed Operation
  - Orthogonal Frequency Division Multiplexing Access (OFDMA) for licensed and unlicensed use
  - Why a mobile version of 802.16?
  - 802.16e MAC and PHY enhancements
    - o Handover, Cell Selection
    - o Sleep mode
    - o The Selectable OFDMA PHY
6. **Options for 802.16 Implementers**
  - Advanced antenna systems
  - Closed Loop vs. Open Loop system
  - MIMO vs. STC vs. Beamforming
  - Coexistence problems and specifications
7. **WiMAX Profiles**
  - WiMAX Product Certification
8. **WiMAX and BWA Network Planning**
  - Network Planning Process
  - Propagation, fading and Channel Models
  - Range Limited vs. Capacity Limited planning
  - Site configuration
  - Frequency Planning and Re-use factor, FUSC and PUSC
  - System capacity and dimensioning

## Who should attend?

- Technical Managers, wanting a good understanding of the challenges and tradeoffs of WiMAX as a BWA technology
- Development Engineers requiring a good end-to-end introduction to the operation of WiMAX network
- Radio Network Engineers
- System and R&D Engineers aiming to be familiar with the network planning and deployment aspects of wireless networks
- Anyone who needs to know about WiMAX, how it works and how it is deployed.

