Course ID
OM
Course Duration
3 days

Course Title
Principles of OFDM and MIMO

Related Courses

- 3G LTE/SAE: A Technology Overview (LTE-TECH, 3 days)
- WiMAX and Mobile WiMAX: An Advanced Tutorial Including 802.16e (3 day(s), WIMAX-TECH)
- UMTS-FDD: Network Architecture, Operation, and Design (3 day(s), UMTS-FDD)
- UMTS-TDD: Network Architecture, Operation, and Design (2 day(s), UMTS-TDD)
- HSDPA: Network Architecture, Operation, and Design (2 day(s), HSDPA)
- HSUPA: Network Architecture, Operation, and Design (2 day(s), HSUPA)

Aimed At

Those who wish to enhance their understanding of the OFDM and MIMO technologies as employed in the latest WCDMA releases, LTE, and WiMAX.

Group Size

5-25

Prerequisites

A basic knowledge of the GSM/WCDMA functionality will be helpful.

Course in a Nutshell

OFDM and MIMO techniques have been incorporated into the newest wireless network enhancements including the latest UMTS releases, WiMAX, and LTE. Thus an understanding of the OFDM principles in coordination with the latest MIMO applications is essential for a good appreciation of the emerging wireless telecommunications technologies.

Customize It!

Are you a mobile networks engineer who would like to catch up with OFDM/MIMO technology? Or are you an equipment/software developer wanting to stay abreast of the emerging 4G+ technologies? Let us know so we can focus on OFDM and MIMO from the standpoint of the technologies of interest to you.

Learn How To

- Summarize the GSM/GPRS network architecture
- Explain the fundamentals of OFDM and MIMO
- Describe how OFDM/MIMO have been employed in LTE, WiMAX and the latest WCDMA solutions

Course Outline

- Evolution to 4G Wireless: GSM and 3GPP standards
- Evolution of GSM to GPRS/EDGE, WCDMA, HSPA, and LTE
  - GSM technology: BSS and NSS architectures
  - GSM functionality
  - GPRS/EDGE data solution
  - WCDMA principles
  - UMTS architectures
  - The latest solution: LTE
- Long Term Evolution (LTE)
  - The overall Evolved Packet Solution (EPS) architecture
  - The radio network solution: LTE
  - The core network solution: EPC
- OFDM Principles in LTE
  - FDD-TDD solution
  - Transmission matrix: Time domain structure
  - Mathematics of OFDM principles with simulations
  - Radio interface structure in LTE
  - Logical channels
  - Transport channels
  - Physical channels
  - Uplink transmission
  - Downlink transmission
- OFDM Principles in WiMAX
  - The WiMAX solution
  - Radio interface structure in WiMAX
- MIMO Explained
  - Antenna principles
  - Basic radio channel theory
  - Radio characteristics
  - Single Input/Single Output (SISO)
  - Multiple Input/Single Output (MIMO)
  - MIMO principles
- Multiplexing
  - Precoding
  - Tx diversity
  - Spatial multiplexing
  - Antenna beamforming
- MIMO Solutions
  - MIMO in WCDMA

- MIMO in LTE
- MIMO in WiMAX

- Wrap-up: Course Recap, Discussion, Evaluations

How You Will Learn

- A seasoned wireless technologies expert, well-versed in the whole range of technologies, will present this course in interactive lecture format.
- Along with the lecture, we will employ exercises, case studies, and interesting group activities to enhance the instruction and communicate the key points.
- If you already know something about WCDMA, WiMAX, LTE, OFDM, or MIMO, we will build on that knowledge. We'll compare and contrast what's familiar with what's new, making the new ideas easier to learn as well as more relevant.
- If your background is less technical, we will use meaningful and ingenious examples and analogies to simplify the complex subject matter.
- You will receive a printed Participant Slides Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised *Dec 15, 2009*