

Course ID
WIRELESS-EXEC
Course Duration
2-4 days

Course Title
State-of-the-art of Wireless Communications for Non-engineering Professionals, Managers, and Executives

Related Courses

- State-of-the-art of WiMAX for Non-engineering Professionals, Managers, and Executives (WIMAX, 1 day)
- WiMAX: A Business Perspective (WIMAX-BIZ, 1 day)
- State-of-the-art of WiFi for Non-engineering Professionals, Managers, and Executives (WIFI, 1 day)
- State-of-the-art of Satellite Communications for Non-engineering Professionals, Managers, and Executives (SATCOM- EXEC, 1 day)
- GSM: A Technology Overview (GSM-B, 1 day)
- iDEN™: A Technology Overview (IDEN-O, 1 day)
- Wireless Network Structure, Operation, and Technologies (WIRELESSNET, 3 days)
- State-of-the-art of VoIP Technology for Professionals, Managers, and Executives (VOIP-EXEC, 1 day)
- Technologies: A Comparative Study (COMPARISON; 2-4 days)

Aimed At

Are you a non-engineering professional, managers, or executive who needs to have an understanding of the technology and business of wireless communications? Are you swept away by the technical jargon? If so, this course is for you.

Group Size

5-25

Prerequisites

There are no prerequisites, but a degree of ease with technology-related issues will be helpful.

Course in a Nutshell

This two-to-four day course will not only help you master the jargon but also place the rapidly changing wireless technology in its proper perspective. The course duration is determined by the topics selected by the audience and the depth to which they are covered. The presentation will be in layman's terms, but without sacrificing the technical depth or accuracy.

We will begin by carefully articulating the principles underlying analog and digital communications, networking, and how they all came together in the "cellular" revolution that led to today's wireless networks. We will also learn about the need for and capabilities of the emerging 2.5/3G and broadband technologies and their various implementations around the world.

At the end of this course, you will have acquired a broad understanding of how wireless networks work, the forces that drove the evolution of the technology from one stage to the next, and the future of wireless – both from the technical and business perspectives. This will help you ask the right questions and make the right decisions.

Customize It! This course is offered in multiple versions with varying levels of emphasis on technical and business issues for audiences such as:

- Investors, analysts, and management consultants
- Policy makers, regulators, and attorneys
- Executives, general managers, and technical managers
- Accounting and finance
- Human resources and recruiting
- Business strategy, marketing, and sales
- Network deployment, procurement
- Customer billing and support

Let us know your purpose for taking this course, so we can tailor it to suit your particular needs and interests.

Learn How To

- Learn the key telecommunications, networking, and cellular communications concepts that underlie all wireless networks
- Define the important terms related to wireless networks and technologies
- Explain how the wireless technologies evolved, the various families of technologies, and their interrelationships
- Describe the strengths, limitations, and operation of each of the major wireless technologies currently in use around the world
- List the factors that are driving the emergence of 2.5/3G, WiFi, and WiMAX technologies
- Describe how 2.5G/3G, WiFi, and WiMAX technologies fit into the wireless marketplace

Course Outline

Part 1: RF Basics

- Radio waves: What they are
 - Some basic trigonometry: Sine function, the building block of all that follows
 - Amplitude, frequency, and phase: Three properties that define a radio wave
 - The electromagnetic spectrum from zero to infinity
- Radio waves: How they propagate
 - Amplitude, power, and signal strength
 - Transmitted power versus received power
 - Free space propagation and plane earth model
 - Propagation in urban, suburban, and rural areas, over water and mountains
 - Propagation versus fading, fading models and countermeasures
- Modulation techniques
 - Modulation: What is it? Or: without it there is no communication!
 - Analog modulation: Amplitude and frequency modulation (AM and FM)
 - Digital modulation: Amplitude Shift Keying (ASK), Frequency Shift

Part 2: A Primer on Telecommunication Systems

- Analog communications
 - Time functions as signals; prime example: human speech
 - Power spectral density
 - AM and FM revisited
 - Noise characteristics and statistical description
 - Spectrum and bandwidth as a public resource
- Digital communications
 - The end-to-end digital path: What are the issues and tradeoffs
 - Channel capacity, bit rate, modulation complexity, and spectral efficiency: ASK, FSK, PSK revisited
 - Modulation complexity as it relates to the evolving technologies
 - Multiple access: The problem and solutions
 - FDMA versus TDMA versus CDMA
- Key concepts of networking
 - Circuit and packet switching concepts
 - Voice and data networks
 - Evolution to voice over IP

Part 3: Wireless Communication Systems

- Fundamental architecture of cellular systems
 - Frequency reuse, reuse factor
 - Control versus traffic channels
 - Capacity and channel assignment issues
 - Overlapping cells and hand-off (handover) process
- Call processing and signaling issues
 - Camping process and mobile identification/registration procedures
 - Mobile originated call set up procedures
 - Mobile terminated call set up procedures
 - Location area updates and (mobile) paging procedures
 - Key aspects of call progress, measurements, reports, and their functionality
 - Roaming issues, signaling, and authentication procedures

Part 4: Wireless Technologies: Their Drivers and Implementations

- Analog systems and AMPS
- Evolution of AMPS and the FDMA/TDMA/CDMA “mega” debate
- Evolution of IS-54 and IS-136: The Cingular and ATT Wireless paradigms
- Qualcomm, CDMA, and IS-95: The impossible-to-work technology that actually works phenomenally well!

- A relatively small but important player: iDEN™ and iDEN™ operators
- Development of GSM in Europe and its “export” to the rest of the world, including the USA
- Factors driving the 2.5/3G evolution
- Evolution of GSM to GPRS/EDGE, CAMEL and on to HSDPA/HSUPA, UMTS-FDD, and UMTS-TDD
- Evolution of IS95 to 1xRTT, 3xRTT, 1xEVDO, and 1xEVDO
- Wireless LAN’s and MAN’s: Emergence of WiFi and WiMAX

Part 5 : Case Study (Optional): An In-depth Study of the Technology of Interest to the Audience

- Detailed structure and operation
- Strengths and limitations
- Standing in the marketplace

Part 6: A Look at the Future of Wireless

- Future of 3G, WiFi, WiMAX, and mobile data
- OFDM, UWB CDMA, and what next?
- Convergence of “all” networks: Wireline, wireless, Internet, etc
- Course recap, Q/A, and evaluations

How You Will Learn

- A seasoned instructor will present this course in interactive lecture format
- Along with lecture, we use exercises, puzzles, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- If you already know something about the technology, we will build on that. We’ll compare and contrast what’s familiar with what’s new, making 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 learn the key concepts of wireless communications from both the technical and business perspectives.
- You will receive a printed Participant Handbook which will help you remember and retain what you learned in class and apply it on your job.

Revised

October 2, 2006