Course | Wireless and Mobile Communications: Technological Issues & Market Trends
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Overview | The vision of “Optimally Connected Anywhere, Anytime” has energized the global Telecom, IT and semiconductor industries. The realization of that vision though hinges upon the integration of an unprecedented number of heterogeneous wireless systems and networks to support in a synergistic way widely varying user needs, service requirements and radio environments (home, office, vehicular, cellular/mobile, satellite, etc).

Starting with today’s 3G mobile and broadband short-range wireless standards, this course addresses system aspects of future wireless communication networks with the focus on the Physical/Baseband and Medium Access Control (MAC) Layers. Systems under consideration will cover the personal level (Personal-Area Networks), the local level (Wireless-LAN), the cellular level (UMTS) and the wider area level (BWA). The approach will be to: provide a market outlook of the wireless landscape; overview existing and evolving standards; identify key enabling technologies for future generation systems (Multi-carrier Modulation schemes, MIMO systems and Space-Time-Coding, Ultra-Wideband radio, Ad-hoc networks, etc); and, briefly address aspects of overall system optimization concerning end-to-end security management and Quality-of-Service support.

Objectives | ▪ Broad overview of the state of wireless and mobile communications
▪ Discuss main physical, architectural and networking issues of cellular and wireless LAN systems
▪ Identify key technologies that will enable the next generation of wireless systems and networks

Who should attend | ▪ Telecom Engineers, Applications Developers.
▪ Telecom Technical Managers

Prerequisites | Principles of telecom systems design

Duration | 5-day sessions

Instructor | Dr. G. Yovanof

Course outline | Day 1: The Market Status of Wireless Radio Communications
▪ Market Outlook - Trends in Wireless Design
Wireless System Design
▪ Impairments of the Mobile RF Channel characteristics:
  o Multipath, Fading, Doppler effects
▪ Channel models (empirical, statistical, deterministic)
▪ Design Challenges

Day 2: Transceiver Design - Baseband
Transceiver Design: Physical Layer – Baseband System
▪ Introduction to the Theory of Digital Communications
▪ Digital Modulation
▪ Equalization
Professional Education Programs

- Error Correction Coding (FEC)

Day 3: Multiple Access Communications
Principles of Multiple Access Communications
- Multiplexing & Multiple Access FDD/TDD, FDMA, TDMA
- Spread-Spectrum: Direct-Sequence, CDMA
Concepts of Wireless MAC Layer design: ALOHA, CSMA
The Cellular Concept

Day 4: Current Systems
Wireless Communication Systems & Networks
- Cellular: GSM, WCDMA/UMTS
- Wireless Local Area Networks: WiFi, Bluetooth
- Wireless Metropolitan Area Networks: WiMax, 802.16a

Day 5: A Glimpse of the Future
Future Wireless Systems – 4G Communications
- The VISION: Always Best Connected
- Key Enabling Technologies:
  - Ultra Wideband (UWB) Radio, MIMO systems, Mobile Ad-hoc Networks
- Cross-Layer Design Issues

Tuition Fee
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