

Course ID

**WIFINET**

Course Duration

**4 days**

Course Title

**Metropolitan WiFi Network Design and Deployment**

**Related Courses**

- Wi-Fi Technology: Principles and Operation (WIFI3, 3 days)
- IEEE 802.11 (WiFi) Wireless LAN Security (WIFISEC, 3 days)
- Wi-Fi: Technology, Applications, Design, and Deployment (WIFI-TECH, 2 days)

**Aimed At**

Those with some prior experience in the design of WiFi systems who need an advanced course on the design and deployment of metropolitan WiFi networks.

**Group Size**

5-25

**Prerequisites**

Some prior exposure to wireless in general and WiFi in particular will be helpful.

**Course in a Nutshell**

WiFi networks, from small hotspots to large metropolitan systems, are becoming increasingly common in technically advanced and developing countries alike. The technology is extremely adaptable in terms of capacity and application and is often lowest cost solution to providing broadband services. For anyone involved with telecommunication and information technology, understanding this technology is a fundamental requirement.

In this course, you will learn the techniques required to design wireless wide-area networks for optimal coverage, capacity, and quality of service for the subscribers' applications. We will begin by discussing how the determination of coverage and capacity requirements begins with understanding when, where, how, and why your subscribers will use the network. This will be followed by a comprehensive discussion of the network design methodologies. We will conclude with a discussion of the tools and techniques for managing the network and maintaining a high-quality subscriber experience.

**Customize It!**

We can customize this course to the backgrounds and needs of your audience at little to no added expense. We can tailor the topics covered and the "tech level" of this course to suit the needs of varied audiences such as WiFi network designer and technicians, equipment or application designers, business managers, or marketing/sales personnel.

**Learn How To**

- Understand the key application factors that impact capacity requirements
- Use engineering techniques to design for optimum RF coverage
- Use engineering techniques for system capacity planning

- Perform WiFi channel planning and interference mitigation
- Understand mesh technology and mesh network performance
- Design point-to-point links
- Conduct site surveys for best engineering practices

## Course Outline

- Introduction
  - Key RF Spectrum Basics: Licensed and License-Free
  - Review of Important RF Concepts
    - Bandwidth, Data Rate, and Traffic Load
    - LOS and N-LOS
    - TDD and FDD
  - Wireless Network Topology Review
- Subscriber Applications
  - Real-time Applications
    - Internet Access
    - VoIP
    - Gaming (Interactive)
    - Video Surveillance Systems
    - Video Conferencing Systems
  - Best Effort Applications
    - Email, Data and FTP service
    - Music and Video Download Service
  - QoS/SLA Requirements Impact
- Network Capacity Planning
  - Calculating Application Traffic Loads
    - Spread Sheets Workshop
  - Back haul Design/Sizing
    - WiMAX
  - Service Performance Measurements
    - Throughput
    - Latency and Jitter
    - Packet Loss
- Channel Planning
  - Licensed Systems
  - License-free Systems
  - Cellular Network Model
- Interference Mitigation
  - Licensed System Advantages
  - Spread Spectrum Basics
  - Antenna Pattern and Alignment
  - Self-interference (Co-channel)
  - Foreign Interferer

- Frequency Coordination
- RF Coverage Planning
  - What Is the Required Service Area
  - Point-to-Multipoint
    - Terrain Databases
  - Point-to-Point
    - Terrain Survey
    - On-line Tool
  - Link Budget Analysis
    - Spread Sheets Workshop
- Indoor System Design
  - Unique Issues
  - Design Tools
- Site Survey Techniques and Tools
  - GPS, etc.
  - Spectrum Analysis
  - Documentation
- Mesh Technology
  - Why Mesh Is Important
    - Self-forming
    - Self-healing
  - How Mesh Works
    - Bridging
    - Repeating
    - Routing
    - Algorithms
  - Single Radio/Multiple Radio
    - The Technical Differences
    - Which Mesh Do You Need
    - Integrated and Non-integrated Solutions
  - Pros and Cons
  - Mesh Vendor Comparisons
    - Ecosystem
  - A Real Network Deployment Example
- Wrap-up
  - Questions and Review

**How You Will  
Learn**

- A seasoned instructor, who is well versed in WiFi along with a variety of other wireless technologies, will present this course in interactive lecture format.
- Along with the lecture, we will use exercises, case studies, and interesting group activities to enrich the instruction and drive home the essential points.
- If you already know something about WiFi or wireless, we will build on that. 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 Handbook which will help you remember and retain what you learned in class and apply it on your job.

*Revised*

*May 28, 2008f*