

Course ID
WIFILAB
Course Duration
2 days

Course Title
WiFi Hands-on

Related Courses

- Wi-Fi Local Area Network Operation and Security (WIFI-NOS, 4 days)
- WIFI: A Tutorial for Those Familiar with Wireless/Cellular Networks (WIFI-TO, 3 days)
- IEEE 802.11 (WiFi) Wireless LAN Security (WIFISEC, 3 days)
- ZigBee Hands-on (ZIGBLAB, 2 days)
- Bluetooth: Operation, Security, Applications, and Coexistence (BLUEOP, 3 days)

Aimed At

Product developers, integrators, testers, managers, and other involved in creating the next generation multimedia wireless Wi-Fi products, services, and solutions.

Group Size

5-25

Prerequisites

Some prior exposure to wireless technologies will be helpful but is not required.

Course in a Nutshell

Using lecture interspersed with lab work, this workshop will help you acquire a thorough understanding of 802.11 operations, with a focus on delivering a rich voice, video and data user experience. You will learn about the physical layer and the challenges of operating in unlicensed spectrum. You will also gain an in-depth understanding of how to connect to a Wi-Fi network and send data. Covered are MAC frame format, 802.11e QoS, 802.11n high throughput, and 802.11ac very high throughput.

The lab work will require the participants to bring Windows based laptops to the classroom, and it will use the spectrum analyzer Metageek Chanalyzer 4 and the packet analyzer Wireshark.

Customize It!

We can customize this course to your technical requirements at little to no additional cost.

**Course
Outline**

- Establishing the groundwork
 - Introduction to Wi-Fi and spectrum considerations
 - Key 802.11 specifications

Labs

- Introduction to spectrum analyzer
- Introduction to packet analyzer Wireshark

- 802.11 operations
 - Contrasting 802.11 topologies
 - Beacons
 - Finding a Wi-Fi network
 - Getting authenticated on a Wi-Fi network
 - Sending data using Distribution Coordination Function (DCF)
 - How collisions are handled
 - Sending data using Point Coordination Function (PCF)

Labs

- Analyzing 802.11 authentication

- 802.11 MAC frame structure
 - Power save operations
 - Sending multicast and broadcast frames
 - Generic frame structure
 - Frame types
 - Multiple address fields
 - QoS frame structure

Labs

- Recognizing 802.11 frame types
- Determining if 802.11 frames are protected

- 802.11e QoS objectives and applications
 - Enhanced Distributed Channel Access (EDCA)
 - Traffic priorities and Access Categories (AC)
 - Hybrid Controlled Channel Access (HCCA)
 - Negotiating a traffic stream

Labs

- Analyzing 802.11 QoS data

- 802.11 introduction to 802.11 physical layer
 - A look at the 2.4 GHz and 5 GHz bands
 - Channel planning and deployment considerations
 - Understanding 802.11a,g OFDM parameters
 - How high data rates are achieved
- IEEE 802.11n physical layer
 - Contrasting 802.11g and n OFDM radios
 - Modulation and coding scheme enhancements
 - 40 MHz channels and subcarrier allocation
 - Achieving 600 Mbps
 - 802.11n MAC layer improvements required to support higher data rates

Labs

- Identifying channels and channel bandwidth
- Radio techniques underlying IEEE 802.11n,ac
 - Understanding OFDM
 - How Spatial Multiplexing (SM) achieves higher data rates
 - Beamforming
 - Multi-user MIMO
- IEEE 802.11ac Very High Throughput
 - Comparing and contrasting 802.11n and ac
 - Multi-channel solutions
 - High levels of modulation
 - Explicit beamforming
 - Improvements to frame aggregation
 - Wi-Fi Alliance wave 1 certification

Labs

- A closer look at the 5 GHz band
- Wrap-up
 - Course Recap and Q/A
 - Evaluations

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