

# CSI-HO-026 - Hands On WLAN Operations - 2 Day



2-Day Instructor Led Hands On Lab Class

Minimum 10 students - Maximum 20 students

## What Students are Saying about this class:

- “Just wanted to say well done, as well as thank you. As you likely deduced, our company is most definitely lacking in the wireless testing equipment department. As I'm sure the free software your class presented will prove more than helpful, I hope that the members of our management attending this class, see fit to invest in a few of the spectrum analyzers you recommended. Thanks again, and I assure you that I learned a whole lot more than I ever figured I would about the dreaded WLAN we all deal with in this industry.”
- “This is an amazing course. Learning about Interchannel interference & other devices (microwave)”
- “Very intuitive website and course structure, very interesting, keep it up!”
- “Great Instructor...is patient and works with the students to ensure everyone is on the same page of understanding. Helps those that are stuck and appreciates that there are no 'stupid' questions!”
- “Andrew was awesome. Very knowledgeable - eager to help...speaks clearly, timely, answers questions.”
- “Best Class I have ever attended – great job Andy”

# Course Description:

Know

## The Problem in a Nutshell

- Customer: "The Internet is slow or poor quality in the kitchen."
- SP: "Everything looks good from the modem – the problem may be in your wireless router."
- Customer: "It works fine in the living room, it has to be your network!"



- Customer sees all the equipment as part of the Internet service.
- How do we master the wireless operations and better understand the issues to help now, and avoid problems later?

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ing the fundamentals of Wireless LAN Operations is vital to anyone who is in the networking field today, whether it be Service Provider level or Enterprise level, especially considering the need to wireless access technologies. This insightful and revealing course has been designed to focus on the operational aspects of implementing and maintaining a WLAN deployment, networking design, and performance measurement.

The course is a combination of knowledge training, systems analysis, with hands-on exercises using a variety of tools in a swift, comprehensive, and understandable way.

- "Where is the best place to deploy the Access Point?"
- "What must I know about WLAN deployment options that will affect the network operation?"
- "What tools exist to help me analyze and design the best WLAN implementation?"
- "How do I properly configure WLAN equipment to improve customer satisfaction?"

## Course Objectives:

The objectives of the course are to develop a "hands-on" skill set targeted at Wireless technology and IP Routing in the following key areas:

- WLAN Site Survey procedures and tools
- 802.11 a/b/g/n/ac operation
- IP Addressing and Subnetting in a deployed WLAN
- Delivering Wireless Quality of Service with IP
- Be able to design/redesign WLAN Operation to mitigate performance issues
- Attain a fundamental understanding of WLAN Operations and improve customer service

These objectives are met by covering the necessary technical bases in a straight forward manner, by keep the content in context of the objectives - connecting the dots. Utilizing a short, subject specific architecture with exercises to drive home key points and Hands-On experience that reveal these points builds skills and knowledge based on Bloom's Taxonomy. The presentation is always industry current and up-to-date using a technology specialists.

## Audience:

The target audience for this course is anyone in Field Operations, Customer Support, Engineering, Dev. Test, Technical Marketing, or even Sales Engineering that requires a solid and complete understanding of WLAN operations with a frame of reference as the Wireless or Wired Service Provider.

Ideal candidates are:

- Operations individuals that will provide WLAN's, configuration and support services
- Customer Support individuals that must know WLAN's that must understand problems and provide solutions
- Network Design Engineers that need to understand WLAN services and applications
- Network Management individuals that are providing element and network management tools
- Technical sales individuals that must be able to correlate features with functionality
- Technical marketing individuals that want more than just a basic understanding of WLAN's

## Course Prerequisites:

This course appeals to anyone needing the skills and knowledge of WLAN's. The ideal student will have some experience in Wireless networking and operations, however no prior knowledge is necessary.

All students must attend with a lap-top computer in order to execute the Lab Exercises. If the course is held at a classroom where computers are available, the Lap-top computer will not be required.

## Course Outline:

- Section 1: Establishing the Groundwork
- Section 2: Radio Frequency Review
  - Radio Chip Sets
  - Modes of Operation
  - Wi-Fi Protocols
  - 2.4 GHz Channels
  - 5 GHz Channels
  - Duplex and Power
- Section 3: 802.11 MAC Layer Review
  - Base Stations and Stations
  - Service Sets and SSID's
  - Mesh Networks and Roaming
  - MAC Addressing
  - 4-Way Handshake
  - Media Access Control for Wireless
  - Types of Wi-Fi Frames and Formats
  - Scanning and Joining a Wi-Fi Networks
  - Network Authentication
  - Network Association
- Section 4: WLAN Site Survey
  - Purpose of Site Survey
  - Types of Interference
  - Scanners vs. Spectrum Analyzers
  - Spectrum Analyzer Tools for Field Operations
  - Lab/Demonstration
  - Identifying Reachable Wireless Systems
  - Wi-Fi Scanners and Site Survey Tools
  - Lab Exercise
  - Range Extenders
  - Coverage Best Practices
  - Looking at Frames with Wireshark
  - Lab Exercise

- Capturing Options
- Dissecting Radiotap Headers
- Lab Exercise
- Dissecting Beacon Frames
- Dissecting LAN Management Frames
- Lab Exercise
- Throughput Testing
- Section 5: IP Network Configuration Options
  - Understanding Network Address Translation
  - Understanding Dynamic vs. Static Translation
  - Understanding Port/Port Range Forwarding, Port Triggering
  - Understanding the DMZ
  - Understanding the Default Gateway
  - Understanding the DHCP Server
  - Lab Exercise
  - Understanding the DNS Configuration/Operation
  - Lab Exercise
- Section 6: QoS on the WLAN
  - Defining the Purpose of QoS
  - Discussing the Application Impact of QoS
  - QoS Fundamental Tools
  - 802.11e and WMM
  - Applying QoS on a Gateway
- Section 7: TR-069
  - What is TR-069?
  - The TR-069 Protocol Stack
  - TR-069 Protocol Format
  - What is SOAP?
  - Message Structure
  - Communication Ladder of TR-069
  - TR-069 Events
  - TR-069 M Events
- Section 8: WLAN Troubleshooting
  - Troubleshooting Steps
  - Device Drivers
  - Lab Exercise

- Distance and Speed
- Asymmetric Power
- Signal Strength and Drops
- Number of WLAN's
- Number of Devices
- Lab Example Problem #1
- Lab Example Problem #2
- Lab Example Problem #3
- Lab Example Problem #4
- Lab Example Problem #5
- WLAN/SSID Best Practices