

# Certified Wireless Analysis Professional

A 4 day **Hands on** training course



## Description

This WiFi analysis course consists of hands-on learning using the latest enterprise wireless LAN analysis and troubleshooting tools. The course takes an in-depth look at the functionality of WLANs, intended operation of the 802.11 protocol and Wi-Fi Alliance specifications, WLAN frame formatting and structure, troubleshooting methodology, and protocol analysis. It also includes extensive training in modern spectrum analysis with a focus on advanced RF behaviour analysis, data collection methods, interpreting spectrum plots and charts, and understanding advanced features of WLAN spectrum analysers.



## Key outcomes

By the end of the course delegates would have covered:

- ✓ Analyse WiFi frames using Wireshark.
- ✓ Explain 802.11 protocol operation.
- ✓ Troubleshoot WiFi networks using Wireshark.
- ✓ Troubleshoot WiFi networks using spectrum analysers.



## Training Approach

This structured course uses Instructor Led Training to provide the best possible learning experience. Small class sizes ensure students benefit from our engaging and interactive style of teaching with delegates encouraged to ask questions throughout the course. Quizzes follow each major section allowing checking of learning. Hands on sessions are used throughout to allow delegates to consolidate their new skills.



## Details

### Who will benefit?

Technical Network Staff  
Anyone looking to become a CWNP

### Prerequisites

Certified Wireless Network Administrator

**Duration:** 4 days

**Overall rating:** **New course**

### Generic Training



Generic training complements product specific courses covering the complete picture of all relevant devices including the protocols "on the wire".

*"Friendly environment with expert teaching that teaches the why before the how."*  
G.C. Fasthosts

### Small Class Sizes



We limit our maximum class size to 8 delegates; often we have less than this. This ensures optimal interactivity between delegates and instructor.

*"Excellent course. The small class size was a great benefit..."*  
M.B. IBM

### Hands On Training



The majority of our courses use hands on sessions to reinforce the theory.

*"Not many courses have practice added to it. Normally just the theoretical stuff is covered."*  
J.W. Vodafone

### Our Courseware



We write our own courses; courseware does not just consist of slides and our slides are diagrams not bullet point text.

*"Comprehensive materials that made the course easy to follow and will be used as a reference point."*  
V.B. Rockwell Collins

### Customise Your Course



Please contact us if you would like a course to be customised to meet your specific requirements. Have the course your way.

*"I was very impressed by the combination of practical and theory. Very informative. Friendly approachable environment, lots of hands on."*  
S.R. Qinetiq

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## Course Content

### Principles of WLAN Communication

802.11 Working Group, OSI reference model and the 802.11 PHY and MAC, Communication sublayers and data units, WLAN architecture components, Organization of station forwarding Addressing and internetworking operation, Modern WLAN product architectures.

### Physical (PHY) and MAC Layer Formats and Technologies

Physical layer functions, Preamble function and format, Header purpose and structure, Analysis of PHY problems, Physical PPDU formats, 802.11b, 802.11a, 802.11g, 802.11n, MAC frame components, MAC encapsulation, Fields and subfields of the MAC header, Frame Control, Frame types and subtypes and their uses, Addressing, Frame body, Data frame format, Control frame format, Management frame format, Information elements and fields.

### Beaconing and synchronization

Scanning, Client state machine, 802.11 contention, QoS, Admission control, Band steering and airtime fairness mechanisms Fragmentation, Acknowledgments and Block acknowledgments, Protection mechanisms and backward compatibility, Power management, Dynamic Frequency Selection (DFS) and Transmit Power Control (TPC), Security components, methods, and exchanges, Roaming procedures exchanges, Future protocol enhancements.

### 802.11n

Transmit beamforming, Spatial multiplexing, Maximal Ratio Combining (MRC), Space-Time Block Coding, 40 MHz channels, Frame aggregation, HT-OFDM format, Modulation and Coding Schemes (MCS), HT frame formatting and more.

### Protocol Analysis Tools and Methodology

Troubleshooting methodology, Protocol analyser types, Analysis NIC/adaptor selection and constraints, Interpreting results based on location, Analyzer settings and features, Filtering and channel scanning, Interpreting decodes, Using advanced analysis features, Assessing WLAN health and behaviour factors, Evaluating network statistics, Troubleshooting common problems, Wired analysis to support wireless network issues.

### Spectrum Analysis Tools and Methodology

Radio frequency behaviour review, Visualizing RF domains using spectrum measurement tools, Spectrum analyser types and operation, Analyser specifications and characteristics, Understanding spectrum data presentation, Interpreting plots and charts, Common WLAN spectrum analyser features, Identifying transmit patterns, Device classification and network impact, Recognizing transmit signatures.

### Hands on lab exercises

#### Wireshark Setup, Use, and In-Depth Analysis

Wireshark is fundamental to troubleshooting. Labs include:  
Capabilities, configuration, and data display.  
Opening, collecting, saving, and modifying capture files.  
Filtering traffic, and using colouring rules as analysis aides.  
Live captures based on a set of desired collection criteria.  
Identify and isolate network problems.  
Conversation analysis.  
Remote packet capture with an AP.

#### Understanding Frame Components

Familiarity with the frame structure and contents is essential in real-world troubleshooting efforts. Labs include:  
Understanding the MAC header  
Comparing the three major frame types and their subtypes  
Analysing frame formats of individual frame types  
Analysing 802.11n frame components  
Additional information is reported by protocol analysers  
Information not visible in protocol analysers

#### Frame Exchanges

Understanding frame exchange rules and behaviors is critical to identifying expected and unexpected. It is also necessary to understand what is normal so that aberrations can be properly troubleshoot. Labs include:

Connectivity exchanges and sequences  
Legacy and modern security exchanges  
ERP and HT protection mechanisms  
Power save behaviour  
Acknowledgments, block acknowledgments, and supporting action frames  
Dynamic rate switching  
Band steering

**Troubleshooting Common Problems** This lab exposes students to hands-on troubleshooting skills by setting up common problems in WLANs and allowing students to attempt to solve them.

Troubleshooting connectivity exchanges  
Troubleshooting 802.1X and EAP exchanges  
Troubleshooting roaming

#### Spectrum Analyzer Setup, Use, and In-Depth Analysis

Specifically, it will explore the plots and charts used to display spectrum data and how to interpret this data to define a transmitter's impact on the network. The following are covered:

Installing the analyser and using display and navigation  
The "RF perspective" provided by each plot and chart  
Using built-in features and automated device identification  
Characterizing the behaviours of an interference source  
Assessing the impact of an interference source  
Determining the impact of transmitter proximity on interference.  
Identifying signatures of common transmitters  
Remote spectrum analysis with an AP

