

## Wireless LAN Administration (CWNA)

### Course Summary

#### Description

The Enterprise WLAN Administration course provides the networking professional a complete foundation of knowledge for entering into or advancing in the wireless networking industry. From basic RF theory to 802.11 frame exchange processes, this course delivers hands on training that will benefit the novice as well as the experienced network professional.

#### Topics

- Introduction to WLAN Standards
- RF Fundamentals
- Antennas
- RF Math
- RF Regulatory Domains
- Wireless LAN Operation
- Power over Ethernet
- 802.11 Service Sets
- Basic WLAN Analysis
- Coordinating Frame Transmissions
- The 802.11n Amendment
- Site Surveying
- Basic WLAN Security

#### Audience

This class is intended for IT technicians, architects, system engineers, and system administrators.

#### Prerequisites

Students should have basic networking knowledge, including OSI model and IP subnetting.

#### Duration

Four days

## Wireless LAN Administration (CWNA)

### Course Outline

- I. Introduction to WLAN Standards**
  - A. Discuss the standards organizations responsible for shaping the 802.11 Wireless LAN protocol
  - B. Learn how standards compliance is enforced for 802.11 WLAN vendors
  - C. Examine the 802.11 standard and various amendments
  - D. Discuss additional networking standards that are commonly used to enhance 802.11 WLANs
- II. RF Fundamentals**
  - A. Physical aspects of RF propagation
  - B. Types of losses and attenuation that affect RF communications
  - C. Types of modulation and coding schemes (MCS) used for 802.11 communications
  - D. How channels and bandwidth are related to each other in wireless networks
  - E. Types of Spread Spectrum used in 802.11 networking
- III. Antennas**
  - A. Types of antennas and antenna systems commonly used in 802.11 WLANs
  - B. Antenna Polarization and Gain
  - C. Antenna implementation and safety
  - D. Types of antenna cables, connectors, and other accessories
- IV. RF Math**
  - A. RF units of measure
  - B. Basic RF math
  - C. RF signal measurements
  - D. Link budgets
- V. RF Regulatory Domains**
  - A. Understand international, regional, and local RF spectrum management organizations
  - B. Understand RF channels in the unlicensed 2.4 GHz and 5 GHz frequency ranges as designated by the European Radio communications Commission (ERC) and the U.S. Federal Communications Commission (FCC)
- VI. Wireless LAN Operation**
  - A. WLAN Hardware Devices
  - B. WLAN Software
  - C. Architecture Types and Evolution
  - D. Ad Hoc & Infrastructure Connectivity Operation
  - E. AP Modes
  - F. Bridging & Repeating
  - G. Mesh Networking
  - H. WLAN Controller Deployments
  - I. WLAN Profiles
  - J. Multichannel Architecture (MCA)
  - K. Single Channel Architecture (SCA)
  - L. WLAN Management Systems (WNMS)
- VII. Power over Ethernet**
  - A. Recognize the two types of devices used in Power over Ethernet (PoE)
  - B. Recognize the differences between the two types of Power Sourcing Equipment (PSE)
  - C. Understand the two ways in which power can be delivered using PoE
  - D. Understand the importance of planning to maximize the efficiency of Power over Ethernet
  - E. Understand the two standards currently available for PoE
  - F. Powering 802.11n APs
- VIII. 802.11 Service Sets**
  - A. The three types of service sets defined for use within 802.11 WLANs
  - B. 802.11 authentication and association
  - C. 802.11 network infrastructure
  - D. Roaming within a WLAN
  - E. Load-balancing as a method to improve congestion in WLANs
- C. View specific examples of how power output limitations are enforced by the FCC for Point-to-Multipoint (PtMP) and Point-to-Point (PtP) wireless connections**

## **Wireless LAN Administration (CWNA)**

### **Course Outline (cont'd)**

#### **IX. Basic WLAN Analysis**

- A. Protocol Analysis
- B. 802.11 Frame Types
- C. Protection Mechanisms
- D. Legacy Power Saving operations
- E. Transmission Rates

#### **X. Coordinating Frame Transmissions**

- A. Differences between CSMA/CD and CSMA/CA
- B. Distributed Coordination Function (DCF)
- C. Network Allocation Vector (NAV)
- D. Clear Channel Assessment (CCA)
- E. Interframe Spacing (IFS)
- F. Contention Window (CW)
- G. Quality of Service in 802.11 WLANS using
- H. Point Coordination Function (PCF)
- I. Hybrid Coordination Function

#### **XI. The 802.11n Amendment**

- A. Challenges addressed by 802.11n
- B. 802.11n PHY/MAC layer enhancements
- C. MIMO and SISO systems
- D. 802.11n coexistence mechanisms
- E. 802.11n integration and deployment considerations
- F. 802.11n site surveying and analysis

#### **XII. Site Surveying**

- A. What is an RF site survey?
- B. Spectrum Analysis
- C. Types of RF site surveys
- D. Manual RF site surveys
- E. Predictive Modeling
- F. Dense AP deployment

#### **XIII. Basic WLAN Security**

- A. The Importance of WLAN Security
- B. Security Policy
- C. Legacy WLAN Security Mechanisms
- D. Modern WLAN Security Mechanisms
- E. Baseline WLAN Security Practices