

# Certified Wireless Network Administrator (CWNA)

## Course Overview

This course provides students with the knowledge and skills to successfully survey, install, and administer enterprise Wi-Fi networks.

### Course Introduction

2m

Course Introduction

### Module 01 - Overview of Wireless Communications

39m

Overview of Wireless Communications

Overview of Wireless History

Standards

The FCC

ITU-R

IETF

ISOC Hierarchy

Wi-Fi Alliance

IEEE

The Hierarchical Model

Carrier Signals

Communication Fundamentals

Module 01 Review

### Module 02 - Fundamentals of RF

40m

Fundamentals of RF

What is an RF Signal?

Characteristics of RF

Wavelength

Frequency

Amplitude

Phase

RF Behaviors

Absorption

Reflection

Scattering

Refraction

Diffraction

Attenuation

Multipath

Gain

Module 02 Review

### **Module 03 - Components and Measurements of RF**

1h 4m

Components and Measurements of RF

Components of RF Communications

Transmitter

Antenna

Receiver

Intentional Radiator (IR)

Equivalent Isotropically Radiated Power (EIRP)

Units of Power and Comparison

Units of Power

Watt

Decibel (dB)

dB Mathematics

dBi

dBd

dBm

The 6 dB Rule

RF Mathematics

Rule of 10s and 3s

Math Examples (eNotes)

Noise Floor

SNR

Received Signal Strength Indicator (RSSI)

RSSI Example

Module 03 Review

### **Module 04 - RF Signal and Antenna Concepts**

38m

RF Signal and Antenna Concepts

Azimuth and Elevation Charts (Antenna Radiation Envelopes)

Beamwidth

Antenna Types

Omnidirectional Antenna

Semidirectional Antenna

Patch Antenna

Planar Antenna

Yagi Antenna

Highly Directional Antenna

Antenna Arrays

Beamforming

Static Beamforming

Dynamic Beamforming

Transmit Beamforming

Antenna Polarization

Antenna Diversity

Multiple-Input, Multiple-Output

Module 04 Review

**Module 05 - IEEE 802.11**

25m

IEEE 802.11  
Original IEEE 802.11 Standard  
IEEE 802.11-2007 Ratified Amendments  
802.11b  
802.11a  
802.11g  
802.11 Review  
802.11i  
802.11r-2008  
802.11w  
802.11n  
802.11ac  
Module 05 Review

**Module 06 - Spread Spectrum Technologies**

42m

Spread Spectrum Technologies  
Industrial, Scientific, and Medical Bands  
900 MHz  
2.4 GHz  
5.0 GHz  
Unlicensed National Information Infrastructure Bands  
U-NII Review  
60 GHz  
Narrowband and Spread Spectrum  
Multipath Interference  
Frequency Hopping Spread Spectrum  
Hopping Sequence  
Dwell Time  
Hop Time  
Direct Sequence Spread Spectrum  
Orthogonal Frequency Division Multiplexing  
2.4 GHz (Cont.)  
5.0 GHz (Cont.)  
Adjacent, Nonadjacent, and Overlapping Channels  
Throughput vs. Bandwidth  
Module 06 Review

**Module 07 - WLAN Topologies**

33m

WLAN Topologies  
Wireless Networking Topologies  
Wireless Wide Area Network (WWAN)  
Wireless Metropolitan Area Network (WMAN)  
Wireless Personal Area Network (WPAN)  
Wireless Local Area Network (WLAN)  
802.11 Topologies  
Access Points  
Distribution Service  
SSID  
BSS

ESS  
Roaming  
Mesh BSS  
WLC Roaming (eNotes)  
Access Point Modes  
Client Station Modes  
Module 07 Review

**Module 08 - Wi-Fi Access**

27m

Wi-Fi Access  
CSMA/CA vs. CSMA/CD  
CSMA/CD (eNotes)  
CSMA/CA  
CSMA/CA (eNotes)  
Distributed Coordination Function  
Interframe Space (IFS)  
SIFS/DIFS  
Carrier Sense  
Point Coordination Function (PCF)  
Block Acknowledgment  
Airtime Fairness  
Module 08 Review

**Module 09 - MAC Architecture**

29m

MAC Architecture  
Packets, Frames, and Bits (eNotes)  
Data-Link Layer  
MAC  
Ethernet Connectivity  
Frame Information  
Management Frames  
Control Frames  
Data Frame Subtypes  
Beacon Frames  
Beacon Frame Types  
Passive Scanning  
Active Scanning  
Authentication  
Open System Authentication  
WEP Authentication  
Association  
Module 09 Review

**Module 10 - WLAN Architecture**

29m

WLAN Architecture  
Management, Control, and Data Planes  
Management Plane  
WLC (eNotes)  
Control Plane  
Data Plane

Autonomous WLAN Architecture  
Centralized Network Management Systems  
Cloud Networking  
Centralized WLAN Architecture  
WLAN Controller  
WLC Options  
Split MAC  
Controller Data Forwarding Models  
Module 10 Review

**Module 11 - WLAN Deployment**

23m

WLAN Deployment  
Deployment Considerations for Commonly Supported WLAN Applications and Devices  
Real-Time Location Services  
Mobile Devices  
Corporate Data Access and End-User Mobility  
Network Extension to Remote Areas  
Wireless ISP: Last-Mile Data Delivery  
SOHO  
ROBO  
Educational/Classroom Use  
Health Care  
Hotspots  
Fixed Mobile Convergence  
Module 11 Review

**Module 12 - Troubleshooting**

53m

Troubleshooting  
Layer 2 Retransmissions  
RF Interference  
802.11 Coverage Considerations  
Capacity vs. Coverage  
Voice vs. Data  
Performance  
Weather  
Module 12 Review

**Module 13 - Security**

46m

Security  
802.11 Security Basics  
Robust Security  
Module 13 Review

**Module 14 - Types of Wireless Attacks**

38m

Types of Wireless Attacks  
Wireless Attacks  
Intrusion Monitoring  
Wireless Security Policy  
Highly Recommended Wireless Security Policies  
Module 14 Review

<b><u>Module 15 - Fundamentals of Site Surveys</u></b>	16m
Fundamentals of Site Surveys	
WLAN Site Survey Interview	
Documents and Reports	
Module 15 Review	
<b><u>Module 16 - Site Survey Tools</u></b>	20m
Site Survey Tools	
Protocol and Spectrum Analysis	
Spectrum Analysis	
Site Survey	
AP Placement and Configuration	
Application Analysis	
Indoor Site Survey Tools	
Outdoor Site Survey Tools	
Coverage	
Confirmation	
Module 16 Review	
<b><u>Module 17 - PoE</u></b>	18m
PoE	
Non-Standard	
802.3af	
Powered Device	
Discovery	
Endpoint	
Midspan	
MDI	
PoE	
Module 17 Review	
<b><u>Module 18 - High Throughput (HT)</u></b>	23m
High Throughput (HT)	
802.11n-2009 Amendment	
Wi-Fi Alliance Certification	
MIMO	
Spatial Multiplexing (SM)	
MIMO Diversity	
Space-Time Block Coding (STBC)	
Cyclic Shift Diversity (CSD)	
Transmit Beamforming (TxBF)	
20 MHz Non-HT and HT Channels	
40 MHz Channels	
Module 18 Review	
<b><u>Module 19 - Very High Throughput (VHT)</u></b>	18m
Very High Throughput (VHT)	
802.11ac	
Module 19 Review	

**Module 20 - BYOD**

29m

BYOD

Mobile Device Management

Company-Issued Devices vs. Personal Devices

MDM Profiles

MDM Agent Software

Over the Air Management

Guest WLAN

Guest Isolation

Guest Registration

Module 20 Review

Course Closure

**Total Duration:** 10h 55m