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# CWNA Instructor Led Course Outline

The following list contains the materials covered in the lecture portion of the course.

**Introduction to WLAN Standards**

* Introduction to WLAN industry organizations
* Discussion of protocol standards and compliance
* Overview of 802.11 standard and amendments
* Discussion of additional networking standards
* Regulatory domains and their impact

**Radio Frequency (RF) Fundamentals**

* RF propagation
* Properties of RF waves
* Types of power loss and environmental impact on radio waves
* Spread spectrum, modulation, and coding
* Channels and bandwidth

**Antennas**

* Antenna fundamentals
* Polarization and gain
* Types of WLAN antennas
* Antenna systems
* Antenna implementation and safety
* RF cables, connectors, and accessories

**RF Math**

* RF units of measurement
* Basic RF math
* RF signal measurements
* Link budgets

**RF Regulatory Domains**

* Regulatory domains
* Regulatory bodies and  
   frequency bands
* Output power rules

**Wireless LAN Operation**

* Basic WLAN hardware
* Basic operating modes
* WLAN hardware
* WLAN connectivity
* WLAN architecture
* Wireless Network Management Systems (WNMS)

**Power over Ethernet (PoE)**

* PoE device types
* Powered Device (PD)
* Power Sourcing Equipment (PSE)
* Power delivery
* Planning for PoE
* PoE standards
* Powering 802.11n devices

**802.11 Service Sets**

* Service set types
* Authentication and association
* Network infrastructure
* Roaming within a WLAN
* Load-balancing

**Basic WLAN Analysis**

* Protocol analysis
* 802.11 frame types
* Protection mechanisms
* Power saving operations
* Transmission rates

**Coordinating Frame Transmissions**

* Introducing CSMA/CA
* Distributed Coordination Function (DCF)
* Hybrid Coordination Function (HCF)

**802.11n Amendment**

* Challenges addressed by the high throughput (HT) PHY
* HT (802.11n) PHY and MAC layer enhancements
* MIMO and SISO systems
* HT coexistence mechanisms
* HT integration and deployment
* HT site surveying and analysis

**Site Surveying**

* RF site survey defined
* Gathering information and resources
* Spectrum analysis for site surveys
* Site survey types
* Survey considerations
* Survey deliverables

**Basic WLAN Security**

* Importance of WLAN security
* Security policy
* Legacy WLAN security mechanisms
* Modern WLAN security mechanisms
* Baseline WLAN security practices

## Potential Hands-on Lab Exercises

* **Exploring 802.11**
  + Understanding standard documents
  + Viewing the various sections
  + Mastering the terminology
* **2.4 GHz vs. 5 GHz Congestion**
  + Viewing activity in a spectrum analyzer
  + Viewing active networks in a Wi-Fi Finder (inSSIDer)
* **Antennas**
  + Changing antennas for different results
* **Viewing RSSI**
  + RSSI values of different adapters at the same location
* **2.4 GHz Amplified**
  + The impact of amplifiers vs. antenna gain
* **Configuring APs**
  + Configuring an autonomous AP
  + Configuring a lightweight AP
* **Configuring CLients**
  + Configuring connection profiles
  + Configuring security
* **Using PoE**
  + Using a mid-span PoE injector
* **Protocol Analysis**
  + Capturing frames
  + Analyzing frames
* **Spectrum Analysis**
  + Viewing activity
  + Understanding signatures
* **RTS/CTS Impact**
  + Protection mechanism configuring
  + Performance comparisons
* **802.11n Impact**
  + Spectrum view with an 802.11n AP
  + Spectrum view with an 802.11a/g AP
* **Site Survey Tools**
  + Using tablet- or phone-based site survey software
  + Using laptop site survey software
  + Using predictive site survey software
* **Configuring Basic Security**
  + Configuring a RADIUS server
  + Configuring an AP to use the RADIUS server
  + Configuring a client to connect to the AP