

COURSE OUTLINE

CSCO-690

Fundamentals of Wireless LANs

3 Credits

HOWARD COMMUNITY COLLEGE

Description

Upon completion of this course, the student will apply the principles of wireless data communications, protocols, and standards related to Wireless Local Area Networking (WLAN). Topics include: RF Transmission, propagation, WLAN frequency bands, characteristics and uses of wireless network devices, compare and contrast with standard “wired” network device and WLAN implementations. Students will have hands-on experience in building, configuring, securing, and troubleshooting basic and extended WLANs. Students will be qualified to administer and support different brands of wireless LAN hardware. This course prepares students to sit for Cisco Wireless LAN Specialist (WLANFE) and/or Cisco Wireless LAN Design Specialist (WLANSE) certifications. Prerequisite: CSCO-270. (2 hours lecture, 3 hours lab)

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Describe the principles of wireless modulation/demodulation methods including amplitude, frequency, phase, digital quadrature/binary phase (DQPSK, DBPSK), and gaussian (GPSK).
2. Explain RF transmission, propagation, and WLAN antennae including propagation speed and propagation delay. SNR
3. Develop skills in WLAN frequency bands (ISM). ISM channels.
4. Identify OSI and TCP/IP models and associated layers with special emphasis on WLAN MAC sub layer functions access control, fragmentation, encryption, roaming.
5. Develop the characteristics and uses of wireless network devices (AP, Bridge, Gateway, NIC). Compare and contrast with standard “wired” network devices.
6. Define wireless standards (IEEE 802.11, IEEE 802.11 b, and “Bluetooth”).
7. Explain WLAN access protocols including: CSMA/CA, virtual carrier sensing (RTS/CTS), net allocation vector (NAV), home agent, AP service set identifier (SSID), station synchronization (PCF), AP and WGB association and re-association, roaming, channel polling and coordination (PCL), shared wireless access protocol (SWAP), authentication (ESSID), and privacy (WEP).
8. Define mobile IP addressing and “care-of” addressing.
9. Experiment with various WLAN implementations: Basic Service Set (BBS), Independent Basic Service Set (IBSS), Extended Service Set (ESS).
10. Experiment with various wireless security features, such as WEP, SSID, MAC filtering, and WEP key management.
11. Identify basic networking protocols - TCP/IP, ARP, RARP, SNMP, telnet, DNS.

Major Topics

- I. Introduction to Wireless Computer Networks
 - A. Wireless protocols (802.11, 802.11b, 802.15, HomeRF2.0, 802.11a, 802.11g, 802.11h)
 - B. WLAN, WPAN applications, review of binary and hexadecimal number systems (IP and MAC addressing)
 - C. Applications of Wireless LANs
- II. Wireless LAN Fundamentals
 - A. IrDa
 - B. RF modulation schemes
 - C. WLAN implementations modes (IBSS, BSS, ESS)

- III. Radio Frequency (RF) Fundamentals
 - A. RF behaviors
 - B. Principles of Antennas
 - C. Spread Spectrum Technology
- IV. Wireless LAN Infrastructures Devices
 - A. Access Points
 - B. Wireless Bridges
 - C. Wireless Workgroup Bridges
 - D. Wireless LAN Client Devices
- V. Antennas and Accessories
 - A. RF Antennas and concepts
 - B. Wireless LAN Accessories
 - C. RF amplifier
 - D. RF attenuators
 - E. Lightning arrestors
 - F. RF splitters and connectors
- VI. Wireless LAN Security
 - A. Wired Equivalent Privacy (WEP)
 - B. Advanced Encryption standards
 - C. Filtering (SSID, MAC address filtering, Protocol filtering)
 - D. Attacks on WLAN
 - E. Emerging Security Solutions (WEP key management, Wireless VPN, 802.1x and Extensible Authentication Protocol)
- VII. Site Survey Fundamentals
 - A. Site survey equipment
 - B. Conducting a site survey
 - C. Site survey reporting

Cisco Networking Academy Curriculum at HCC

When a student takes a Cisco course at HCC, that student usually receives more instruction time than they would receive in other formats. Therefore, while taking Cisco Networking courses at HCC, the student may expect not only instruction from Cisco materials but additional academic and practical exercises and course work to better equip the student not only for the corresponding certification exam but for eventual utilization in their professional endeavors.

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of tests, lab reports, quizzes and final exam. This course includes a comprehensive final exam.

Writing/Homework: Each week, students are expected to write a laboratory report after performing that week's assigned experiments.

Other Course Requirements

This course is a course in the Computer Support Technology Program. This course is also intended for students who wish to become Cisco Wireless LAN Specialist (WLANFE) and/or Cisco Wireless LAN Design Specialist (WLANSE).