IT C248: WIRELESS NETWORKING

Item	Value
Curriculum Committee Approval Date	10/27/2023
Top Code	070800 - Computer Infrastructure and Support
Units	3 Total Units
Hours	68 Total Hours (Lecture Hours 54; Lab Hours 14)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S), • Pass/No Pass (B)

Course Description

Formerly: CST C248B. This is an entry-level course in wireless data communications. It covers the fundamentals of wireless technology and provides an overview of protocols, transmission methods, 802.11 network architecture, and IEEE standards. It also examines the broad range of enterprise Wi-Fi technologies available. Topics covered include the basics of radio frequency and wireless data transmission, and the protocols and mechanisms that every wireless network technician needs to understand. Hands-on exercises help students develop skills to prepare for careers such as Network Technician or Wireless Network Administrator. ADVISORY: IT C128. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Demonstrate knowledge and understanding of the fundamental terminology and theory associated with wireless networking.
2. Given a scenario, configure and troubleshoot various wireless devices and network infrastructures.
3. Implement basic wireless network designs in a laboratory environment.

Course Objectives

- 1. Demonstrate a firm grasp of the knowledge and understanding of the terminology associated with Wireless Networking.
- 2. Configure and troubleshoot various wireless hardware and its associated software.
- 3. Implement basic wireless network from given designs.

Lecture Content

Radio Frequency (RF) Fundamentals RF behavior and properties Principles of antennas RF math calculations Link budgets and system operating margins Antennas and Accessories Determining coverage areas Proper mounting and safety Performing outdoor/indoor installations Cables and connector usage requirements Amplifiers, attenuators, lightning arrestors, and splitters Organizations and Standards FCC rules Frequency ranges and channels IEEE 802.11 family of standards Wireless LAN organizations 802.11 Network Architecture Joining a wireless LAN Authentication and association Basic Service Sets Extended Service Sets Independent Basic Service Sets Controller Based WLANs Hardware Installation, Configuration, and Management Access points Wireless bridges Client devices and accessories Residential gateways Enterprise gateways Lightweight Access Points Wireless Network Management Authentication, Authorization, and Accounting (AAA) functions Bandwidth control Wireless Network Management features and products Wireless LAN Security Available security solutions at Layer 2, 3, 7 Security recommendations Site Surveying Understanding the need for a site survey Defining business requirements and justification Facility analysis Determining contours of RF coverage Documenting installation problems Locating interference Reporting methodology and procedures Creating appropriate documentation during and after the site survey

Lab Content

Ad-Hox Wireless Network Setup Autonomous Wireless Network Setup Autonomous Wireless Network Security Wireless Network Scanning Wireless Network Sniffing Wireless Network Out-of-Band Security Lightweight Wireless Access Point Implementation Wireless Network Troubleshooting

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)
- Lab (04)

Instructional Techniques

This course will utilize a combination of lecture, remote virtual machine assignments, classroom/discussion student interactions, problem-solving, quizzes, tests, and troubleshooting assignments to achieve the goals and objectives of this course. All instructional methods are consistent across all modalities.

Reading Assignments

A. Read about and research the configuration and management of common wireless network devices. B. Read about how to properly maintain wireless network documentation. C. Read about wireless networking best practices. D. Read about wireless network security best practices.

Writing Assignments

A. Complete documentation of purpose and use of wireless scanning software.B. Compare and contrast wireless network design types. C. Identify policies and best practices for wireless networking.

Out-of-class Assignments

A. Complete hands-on lab to setup and configure a wireless network.B. Complete hands-on lab to setup wireless network management software on a laptop or personal computer.C. Research based on a given scenario to find a solution using the troubleshooting methodology for wireless network issues.

Demonstration of Critical Thinking

Troubleshoot connectivity issues using appropriate hardware and software tools.

Required Writing, Problem Solving, Skills Demonstration

Install and configure various Wireless software and hardware. Mathematical Problem-Solving Exercises - Simple TCP/IP subnet addressesNon-Mathematical Problem-Solving Exercises - Scenario based problem-solving exercises.Skills Demonstration - Using simulations in a remote lab environment.

Eligible Disciplines

Computer service technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience. Computer service technology: Any bachelors degree and two years of professional experience, or any associate degree and six years of professional experience.

Textbooks Resources

1. Required Coleman, David D. and Westcott, David A. CWNA Certified Wireless Network Administrator Study Guide: Exam CWNA-108, 6th ed. Indianapolis: Wiley Sybex, 2021 Rationale: -

Other Resources

1. Coastline Library 2. IT white papers are available at no charge to all IT students through the Cisco Network Academy or other websites.