NVCC COLLEGE-WIDE COURSE CONTENT SUMMARY
ITN 283 - WIRELESS-NETWORK FIELD SITE SURVEY (W-NFSS) (3 CR)

COURSE INFORMATION


Lecture - 3 hours per week

RECOMMENDED CO-REQUISITES OR PRE-REQUISITES

Prerequisite is ITN 120 Wireless Network Administration. Students must be able to read and write at a college level.

COURSE OBJECTIVES

Upon completion of this course, the student will have a working knowledge of and the ability to:
- Explain lifecycle of a Wireless Local Area Networks (WLAN)
- Explain Radio Frequency Fundamentals
- Explain Antennas and Accessories
- Explain 802.11 Network Architecture
- Explain WLAN Protocols
- Explain how to conduct a WLAN Site Survey
- Explain Troubleshooting WLAN Installations

MAJOR TOPICS TO BE COVERED

- Explain lifecycle of a Wireless Local Area Networks (WLAN)
- Radio Frequency Fundamentals
- Antennas and Accessories
- WLAN Organization and Standards
- 802.11 Network Architecture
- WLAN Protocols
- WLAN Site Survey
- Troubleshooting WLAN Installations

STUDENT LEARNING OUTCOMES

- Explain lifecycle of a Wireless Local Area Networks (WLAN)

Project Planning
Requirements
Analysis
Site Survey
Design
Security
Installation
Testing and Analysis
Operations and maintenance
Radio Frequency Fundamentals

Understand and explain the behavior of RF waves to include Gain, Loss, Reflection, Refraction, Diffraction, Scattering and Absorption.
Define and Explain Voltage Standing Ratio (VSWR).
Explain the principles of Antennas to include line of sight(LOS), Fresnel Zone and Antenna gain.
Explain and define Intentional Radiator (IR) and Equivalent Isotropically Radiated Power (EIPR).
Antennas and Accessories
Omni-directional
Semi-directional
Highly-directional
Determining coverage areas
Proper mounting and safety
Performing outdoor/indoor installations
Power over Ethernet (802.3af and proprietary implementations)
Cables and connector usage requirements
Amplifiers, attenuators, lightning arrestors, and splitters
Fresnel Zones and Free Space Path Loss
Interference, Fading, Multipath Interference and Absorption
802.11 Network Architecture
Joining a wireless LAN
Authentication and association
Basic Service Sets
Extended Service Sets
Independent Basic Service Sets
Distribution systems
Roaming in a wireless LAN
Scanning modes using Beacons and Probe Frames
Power management features
WLAN Protocols
IWLAN Analysis
Differences between wireless and Ethernet frames
802.11 Protocol Architecture
802.11 PHY Layer
802.11 MAC Frame
802.11 Management Frame
802.11 Control and Data Frames
802.11 Protocol Analysis
Power Management, fragmentation and RTS/CTS
Throughput and dynamic rate selection
Analysis of DCF mode and the CSMA/CA protocol
WLAN Site Survey
Understanding the need for a site survey
Defining business requirements and justification
Facility analysis
Interviewing network management and users
Site Survey Tools
Identifying bandwidth requirements
Determining contours of RF coverage
Documenting installation problems
Locating interference
Reporting methodology and procedures
Understanding the customer's network topology
Creating appropriate documentation during and after the site survey
Understanding FCC/FAA rules regarding towers
Understanding safety hazards
Using appropriate hardware and software to perform the survey
Troubleshooting WLAN
Multipath
Hidden node
Near/Far
Identifying and resolving interference problems
Maximizing system throughput
Maximizing co-location throughput
Range considerations
Protocol impact on performance
Environmental impact on Performance