ERIE COUNTY WATER AUTHORITY AUTHORIZATION FORM For Approval/Execution of Documents (check which apply)

| Contract: Project No.: Project Description: Training/Travel Request for Rick Deren | | |
|---|--|--|
| Item Description: Agreement Professional Service Contract Amendment Change Order BCD NYSDOT Agreement Contract Documents Addendum Recommendation for Award of Contract Recommendation to Reject Bids Request for Proposals X Other Training/Travel Request for Rick Deren | | |
| Action Requested: Legal Approval Board Authorization to Execute Legal Approval Board Authorization to Award Execution by the Chairman Board Authorization to Advertise for Bids Execution by the Secretary to the Authority Board Authorization to Solicit Request for Proposals X Other Training/Travel Request for Rick Deren | | |
| Approvals Needed: APPROVED AS TO CONTENT: X Department Head Risk Manager Director of Administration Executive Engineer APPROVED AS TO FORM: Legal APPROVED FOR BOARD RESOLUTION: X Secretary to the Authority | Date: $\frac{10/7/19}{2}$ Date: Date: Date: Date: Date: | |
| Remarks: | | |
| Resolution Date: Item No: | | |

F:\Memos\TDM\Authorization Form_RJD CISCO Training 2019.docx(blue)



ERIE COUNTY WATER AUTHORITY

INTEROFFICE MEMORANDUM October 7, 2019

To: Terrence McCracken Secretary to the Authority

From: Jeffrey Schlierf //// Acting Manager of Information Technology

Subject: Cisco Enterprise Wi-Fi Administration Training - Rick Deren (Network Specialist)

I recommend Rick Deren attend this 5-day training class on Cisco Enterprise Wi-Fi Administration held in San Antonio, TX 11/4/19 - 11/8/19. The estimated cost to send Rick to this training is \$5,660.00 (training and travel combined).

The information covered in this class directly relates to the ECWA Cisco Wi-Fi network and the equipment used in the business and SCADA networks. This class covers Wi-Fi design, security and troubleshooting. The ECWA Wi-Fi network was designed, and is secured by, a very capable outside consultant, Hi-Tech Services Inc. With that said, it is in the best interest of the Authority to have someone in house with the same capability.

JCS Attachments F:\Memos\TDM\RJD CISCO Training 2019.docx

TRAVEL REQUEST

| Name RICHARD DEREN | Today's Date 10/1/19 |
|--|--|
| Job Title NETWORK SPECIALIST | |
| Department INFORMATION TECHNOLOGY | |
| Destination(s) SAN ANTONIO, TEXAS | |
| Reason for Travel / (check one): Training | Authority Business |
| Is this training needed to meet professional licensing | requirements? |
| Description of training or business, and reasons and the ATTENDRESSED ENTERPRISE WIPE NOMINISTANTIAN PROJICES & DAYS OF INSTRUCTION AND HANDS PROFESSIONANG. THE COURSE CONTENT COURS WIFFOR TO CJSCO WIRELESSEQUIPMENT, KNOWLEDGE OB THE CURRENT ECWA WIFI NETWORK. IN HABITIO. AND STRUDARDS WHILE DEGILNING FUTURE ELWA WIN | Denefits of attendance I COURSE IN SANANONID, TX. CWNA COURSE ON LARS TAUGHT BY CISCO CERTFIED SICN, SECORITY AND TROUBLES HOUTING PERTAINING TAINED HELP MUNITOR, SECORE AND TROUBLESHOLT N. I WILL BE ARLE APPLY THE CURRENT TECHNOLOGIES DELEGS TROSZETS. |
| Dates of Travel | |
| From: Day (M T W T F S (3) , Date $1/3/19$ | Γο: Day(M T W T (DS S), Date <u>11 9/19</u> |
| Total number of <u>business</u> days: <u>5</u> | |
| Estimated Cost Transportation costs can be obtained $A_{1A} \stackrel{PAE = 4050.00}{= 5400.00}$ Transportation $\frac{FEMIA}{4930.00}$ Hotel Accommodat | ed from Trish Fabozzi X8456. 5 Mights * 180 rta hight 6 OATS P * 501 PAY tions \$ \$ 900.00 Meals \$ \$ 303.00 |
| TOTAL ESTIMATED COST \$ 2,150.00 W/ Balance in the travel budget prior to this trip \$ 8,2 Comments (i.e. spouse traveling, preferences): FER | REGISTRATION FEE S $5, 666.25$ 250.00 G/L Number 9312(1 Unit # 8525 Primary # 40 (000 Unit # 0000 For Week (270134) |
| BILFANE FRETERENCE. JUN. LEARLY ULLATE AFTERNO BRALY EVENING. | OWN) RETURN FRIDAY - MANUE BUFFALD |
| | |
| Approvals: | |
| Department Head | Date 10/2/19 |
| Executive Director Kunsel Attet | Date 10/1/19 |
| Secretary | Date 10/7/19 |
| Date of Resolution | Item No. |



ENTERPRISE WI-FI ADMINISTRATION (CWNA)

Course Code: 3603

Learn how to prepare for the CWNA exam while learning to survey, secure, and troubleshoot enterprise-class Wi-Fi networks.

Get a head start right out of the gate with a Certified Wireless Network Administrator (CWNA) certification. It is the base certification for Enterprise Wi-Fi within the CWNP family of certifications and a springboard toward earning your security, design, analysis and network expert certifications. Achieving it enhances your networking career profile, providing evidence that you have sought after Wi-Fi knowledge and skills.

The goal of this course is to add Wi-Fi expertise to a networking professional's skillset, while covering all CWNA-107 exam topics. The course begins with discussion topics and hands-on lab exercises covering the basic operation of 802.11 Wi-Fi technology. Once a base of Wi-Fi knowledge is established, enterprise relevant topics such as Wi-Fi design, security, and troubleshooting are covered. You will use enterprise-class hardware and software tools during live lab exercises, all accessible remotely for any instructor-led or virtual class.

As a bonus, you will receive a free exam voucher.

What You'll Learn

- Background and roles of Wi-Fi governing bodies, including the IEEE and Wi-Fi Alliance
- Radio frequency properties and behaviors
- Wireless signal fundamentals, including measurement principles
- Antenna information, including types and installation best practices
- · Wi-Fi standards, including 802.11 extensions ac, ad, af, and ah
- Wi-Fi device types and infrastructure options
- Wi-Fi communications processes, including connection, roaming, and data transfer
- General troubleshooting tips to common real-world 802.11n issues
- Wi-Fi architecture best practices, including both network and wireless design
- Similarities, differences, and peculiarities about Wi-Fi deployments in differing environments (offices, K-12 education, health care facilities, and more)
- · Security standards, best practices, known vulnerabilities, and remediation

techniques for Wi-Fi networks

- Site surveying, including requirements gathering, design, installation, and validation
- Troubleshooting methodology, tools, and techniques, along with common issues

Who Needs to Attend

- Administrators: network, systems, infrastructure, security, and LAN/WLANs
- Support professionals: technical assistance and field support
- · Designers: network, systems, and infrastructure
- Developers: wireless software and hardware products
- Consultants and integrators: IT and security
- Decision makers: infrastructure managers, IT managers, security directors, chief security officers, and chief technology officers
- CCNAs



ENTERPRISE WI-FI ADMINISTRATION (CWNA)

Course Code: 3603

CLASSROOM LIVE

\$3,695 USD

5 days

Classroom Live Outline

WLAN and Networking Industry Organizations

- Wi-Fi Related Organizations
- The IEEE
- PHY Amendments
- 802.11 Amendments
- Wi-Fi Alliance
- PoE (802.3)

RF Characteristics and Behavior

- Electromagnetic Spectrum
- Wavelength, amplitude and other RF characteristics
- Reflection, refraction and other RF behavior
- RF Propagation
- Basic Types of Modulation
- **RF Mathematics and Measurements**
 - RF units of measure
 - Basic RF mathematics
 - RF signal measurements
 - Understand link budgets

RF Antennas and Hardware

- RF Units of Measure
- Types of Antennas and Antenna Systems Commonly Used With 802.11 WLANs
- Antenna Polarization and Gain
- Antenna Implementation
- Types of Antenna Cables, Connectors, and Other Accessories

802.11 PHYs and Network Types

- 802.11 PHYs and Network Types
- 802.11 Frequency Bands
- 802.11 Channels Explained
- OSI Model Layers and Wi-Fi
- 802.11 Physical Layers (PHYs)
- Throughput vs. Data Rate
- RF Modulation Methods
- 802.11 Use Case Scenarios
- WLAN Operating Modes including BSS. ESS and Roaming
- 802.11 Network Devices
 - Access Point Features and Capabilities
 - AP and WLAN Management Systems
 - Wireless Monitoring Systems (Analytics)
 - WLAN Controller Functionality
 - Network Architecture Planes
 - WLAN Bridging
 - Client Devices
 - Client Device OS Configuration
 - Power over Ethernet (PoE) Functionality

802.11 MAC Operations

- 802.11 Frames
- Frame Aggregation
- Guard Interval
- General Frame Format
- PHY Preamble
- Management, Control and Data Frames
- Locating WLANs

802.11 Channel Access Methods

- Differences between CSMA/CD and CSMA/CA
- Distributed Coordination Function (DCF)
- Network Allocation Vector (NAV)
- Clear Channel Assessment (CCA)
- Interframe Spacing (IFS)
- Contention Window (CW)
- Quality of Service in 802.11 WLANs
- Hybrid Coordination Function (HCF)
- Additional Control Frames and Protection Modes

WLAN Network Architectures

- Control, Management and Data Planes
- WLAN Controller Solutions
- Network Architectures
- RF Channel Planning
- Service Set Configurations

• Cell Sizing and Interference

WLAN Requirements and Solutions

- Explore WLAN Deployment Scenarios
- BYOD and Guest Access
- Mobile Device Management
- Radio Resource Management (RRM) and other automatic RF management solutions
- Additional Management Features

Security Solutions for WLANs

- Additional Authentication Features
- Deprecated Standard Security
- Weak Security Mechanisms
- Pre-shared Key and IEEE 802.1X/EAP
- Wireless Intrusion Prevention Systems (WIPS)
- Protocol and Spectrum Analysis for Security
- Using Secure Protocols

Site Surveys, Network Design and Validation

- Survey Processes
- Understanding Requirements
- Verify Design Requirements
- Documentation
- Locating Interference
- Spectrum Analysis
- Application and Throughput Testing
- Protocol Analysis

WLAN Troubleshooting

- CWNP Troubleshooting Methodology
- Protocol Analysis Troubleshooting Features
- Spectrum Analysis Troubleshooting Features
- RF Interference
- Hidden Nodes
- Connectivity Problems

Classroom Live Labs

Remote Lab Familiarization

- Overview
- Task 1: Navigate the GigaWave Remote Lab
- Task 2: Navigate the Interactive Diagram Page
- Task 3: Closing the Lab

Lab 1: Visualizing RF Principles

- Activity Objective
- Visual Objective
- Required Resources
- Task 1: Prepare the Client Laptop in the Remote Lab
- Task 2: Use Ekahau to visualize Free Space Path Loss
- Task 3: Use Ekahau to Visualize Attenuation
- Task 4: Closing the Lab

Lab 2: RF Mathematics

- Activity Objective
- Required Resources
- Task 1: Complete These Power Conversions
- Task 2: Calculate EIRP
- Task 3: Calculate a Link Budget

Lab 3: Visualizing Antenna Patterns

- Activity Objective
- Required Resources
- Task 1: Open the FSPL File in Ekahau
- Task 2: Use Various 2.4 Antenna and Observe the Change in RF Coverage
- Closing the Lab

Lab 4: 802.11 Basics

- Activity Objective
- Task 1: Analyze Wireless Frames
- Task 2: Closing the Lab

Lab 5: Initialize an Autonomous WLAN Deployment

- Activity Objective
- Task 1: Configure an Autonomous AP via CLI
- Task 2: Configure Your Standalone AP from the GUI
- Task 3: Closing the Lab

Lab 6: Configure Security on Autonomous AP WLAN Deployment

- Activity Objective
- Task 1: Configure the Autonomous AP for PSK
- Task 2: Configure Windows 7 Client to Connect to the Pod-X-Auto Using PSK
- Task 3: Add a Local Radius Client to the Autonomous AP
- Task 4: Configure Local RADIUS Server on the Autonomous AP
- Task 5: Configure an SSID for Local EAP on the Autonomous AP
- Task 6: Configure the Windows Supplicant
- Task 7: Closing the Lab

Lab 7: Configuring the WLC Central Switch WLAN Deployment

- Activity Objective
- Task 1: Prepare the Client Laptop in the Remote Lab
- Task 2: Review and Modify Management Access
- Task 3: Review AP Status

Nov 4 - 8, 2019 | 9:00 AM - 5:00 PM | SAN ANTONIO, TX