Course Introduction

Module 01 - Network Basics

Topic A: Network Concepts
- Networks
- Local Area Networks
- Basic Network Types
- Peer-to-Peer Model
- Peer-to-Peer Authentication
- Client/Server Model
- Client/Server Authentication
- Segments and Backbones
- Network Wiring
  - Fiber Optic
  - Twisted Pair
  - Composite Cable
  - Coaxial
- Live Demo: Cable Types
  - Serial
  - Duplex
- Wireless LAN
- Benefits/Drawbacks of WLANs
- Network Protocols
- Wireless Network Protocols

Topic B: Network Architectures
- Network Architecture
- Star Architecture
- Bus Architecture
- Ring Architecture
- Mesh Architecture
- Hybrid Architecture
- Point-to-Point
- Point-to-Multipoint
- Packet vs. Circuit Switching
- Ethernet
- Ethernet Mediums
- Ethernet Standards
- Ethernet Networks
- Data Collisions
- Channel Access Methods
- Token Ring Networks
- Wireless LANs
- Wide Area Networks
- WAN Connections
- POTS/PSTN
- ISDN
- DSL
- Cable
- Satellite
- Wireless WAN
- Cellular
T and E Lines
X.25 and Frame Relay
ATM
Mesh Networks

**Topic C: The OSI Model**
OSI Model
OSI Layer 7
OSI Layer 6
OSI Layer 5
OSI Layer 4
OSI Layer 3
OSI Layer 2
OSI Layer 1
Module 01 - Review

**Module 02 - Wired Computer-to-Computer Connections**

**Topic A: Wired Network Connections**
Fiber Optic Wired Connections
SONET
Fiber Optic Connectors
Fiber Optic Connector Types
Twisted Pair Connections
UTP Categories
Stranded vs. Solid
Twisted Pair Connectors
RJ Connectors
Modern Residential Wiring
RJ-45 Connector
Pin Numbering of RJ-45 Connector
Terminating CatX to RJ-45
Live Demo: Crossover Cable
Coaxial Connections
RG Standards
Thinnet Connectors
Live Demo: Thinnet Connectors
Thicknet Vampire Tap
Plenum

**Topic B: Network Interface Cards and Modems**
Network Adapter
Live Demo: NIC Installation
Live Demo: NIC Removal
Internal NICs
Notebook Computers
NIC Selection
Live Demo: NIC Card
Live Demo: PCM CIA
Addressing
MAC Address
IPv4
IPv6
Character-Based Names
Domain Name System (DNS)
Module 03 - Network-to-Network Connections

**Topic A: Network-to-Network Connection Components**

- Network Access Points
- Internet Service Providers (ISPs)
- Small ISPs
- Regional ISP
- LAN Installation Components
- Cross-Connects
- Standards
- Typical UTP Installation
- Telecommunications Room
- Punchdown Block
- Live Demo: Punchdown Block
- Wire Placement

**Topic B: LAN Wiring**

- LAN Wiring Categories
- Guidelines
- Backbone Installation
- Workstation Runs
- Calculate Workstation Run Length
- Modular Office Systems
- Telecommunications Room Management
- Telecommunications Room Equipment
- Patch Panel
- Connecting Block
- Punchdown Tool
- Punchdown Procedure
- Live Demo: Punchdown Tool

**Topic C: LAN Wiring Tests**

- LAN Wiring Tests
- Testing Equipment

Module 03 - Review
Module 04 - Wired Internetworking Devices

**Topic A: Basic Internetworking Devices**
Common Internetworking Devices
Repeaters
Repeater Placement
Repeater Operation
Repeater Issues
Bridges
Bridge Operation
Bridge Types
Bridge Routing Management
Bridge Filtering and Intelligence
Local and Remote Bridges
Layer 2 Switch
Bridges vs. Switches
Live Demo: Switch
Trunking Example
Routers
Router Operation
About Routers
Router Features
Key Points
Types of Routers
Routing Table Contents
Routing Examples
Bouters
Bridges vs. Routers
Ethernet Hub
Hub Types
Token Ring MSAU
Token Ring Distances
MSAU Functions
Media Converters
Firewalls
Firewall Functions
Hardware Firewall
Software Firewall
Proxy Server
Port and Packet Filtering

**Topic B: Specialized Internetworking Devices**
Higher-Level Switches
Content Switches
IDS and IPS
IDS
Malicious Traffic Detected by IDS
IPS
Traffic Shapers
Multiprotocol Label Switching (MPLS)
Multifunction Network Devices
Module 04 - Review
Module 05 - Wired Communication Standards

**Topic A: The TCP/IP Protocol Suite**

Network Communication Protocols
TCP/IP Architecture
Network Interface Layer Protocols
Address Resolution Protocol (ARP)
MAC Address Filter
Data Packet Addresses
ARP Request Packet Structure
ARP Reply Packet Structure
Router Forwarding
IPConfig
Demo: ARP Connectivity
Internet Layer Protocols
Internet Protocol (IP)
RIP/RIPv2 and OSPF
ICMP/ICMPv6
IGMP
SSH
Transport Layer Protocols
Service Port Numbers
Demo: Port Numbers
TCP
TCP Three-Way Handshake
Microsoft Network Monitor
UDP
Demo: Packet Capture
Application Layer Protocols
HTTP
FTP
Telnet
Demo: Using Telnet
NTP
Email Messaging Protocols

**Topic B: TCP/IP**

IPv4
Classful IPv4 Addresses
Subnet Masks
Network IDs
Special Addresses
CIDR
CIDR Address
Demo: Binary Conversion
Demo: Subnetting Theory
Demo: Subnetting Practical
NAT
APIPA
IPv6
IPv6 Address Types
IPv6 Address Scopes
Subnet Mask Communication
IPv4 Custom Subnets
IPv6 Subnets
IPv6 Custom Subnets
Default Gateway
Address Translation
DNS
DNS Namespace
WINS
Static TCP/IP Configuration
DHCP and DHCPv6
IPv4 Lease Process
IPv6 Lease Process
IPv6 Router Flags
M and O Flags

**Topic C: DHCP Servers**
Installing a DHCP Server
Demo: DHCPv4
IPv6 Scopes
Demo: DHCPv6
Module 05 - Review

**Module 06 - Wireless Networking**

**Topic A: Wireless Network Devices**
Wireless
Wireless Connections
Infrared
Radio
Bluetooth
Wireless Communications
Indoor Point-to-Multipoint LANs
Live Demo: Wireless Router
Outdoor Point-to-Point Links
Outdoor Point-to-Multipoint Links
Wireless Connection Components
Wireless NICs
Live Demo: Wireless Network Adapters
Live Demo: USB Wireless
Wireless Access Points
Wireless Speeds
WAP Placement

**Topic B: Wireless Networking Standards**
Standards
802.1x Standard
802.11 Standard
Access Point
802.11 WLAN Standards
Wireless Protocols
LAN Technologies
Wi-Fi
Bluetooth
802.11a/802.11g
WiMAX
Topic C: Wireless Configuration
- WLAN Security Risks
- Additional Risks
- WLAN Security Components
- Transmission Encryption
- 802.1x Authentication
- Wireless Access Point Configuration
- Securing Your AP
- Demo: WAP
- Wireless Clients
- Wireless Auto Configuration
- Windows CE Wireless Clients
- Module 06 - Review

Module 07 - Security Threats and Mitigation 1h 54m

Topic A: Security Threats
- Security Threat Categories
- Technology Weaknesses
- Configuration Weaknesses
- Human Error and Malice
- Viruses, Worms, Trojan Horses
- Social Engineering
- Dumpster Diving
- Online Attacks
- Countermeasures
- Phishing
- Denial of Service Attacks
- SYN Flood Attack
- SYN Flood Defense
- Smurf Attacks
- Ping of Death
- Distributed DoS Attacks
- DDoS Countermeasures
- Demo: DDoS
- Man-in-the-Middle
- Spoofing
- IP Address Spoofing
- Demo: Port Scanner

Topic B: Threat Mitigation
- Security Policies
- Acceptable Use
- Due Care
- Privacy
- Separation of Duties
- Need to Know
- Password Management
- Account Expiration
- Service-Level Agreement
- Disposal and Destruction
- Human Resources Policy
- Incident Response Policy
- Preparation
- Detection
Module 08 - Security Practices

**Topic A: Operating Systems**

Antivirus Software
Demo: Antivirus
Spyware
Windows Defender
Demo: Spyware
Securing the Operating System
Windows Update
Update Categories
Patch Management
Demo: Windows Updates
Other Updates
System Information
Windows Firewall
Demo: BIOS
Demo: Firewall

**Topic B: Devices**

Firewalls and Proxy Servers
Security Zones
Intranet
Perimeter Network
DMZ
Screened Host
Bastion Host
Three-Homed Firewall
Back-to-Back Firewall
Dead Zone
Traffic Filtering
Network Access Control
Virtual Private Network
IPSec Encryption
Demo: IPSec
Security Issues
Built-In Management Interfaces
Secure and Unsecure Methods
Physical Attack Susceptibility
Overcoming Device Weaknesses
Intrusion Detection and Prevention
NIDS
HIDS
Module 09 - Network Access Control

Topic A: Authentication
AAA
Usernames and Passwords
Password Protection
Strong Passwords
Multiple Passwords
Authentication Factors
One-Factor Authentication
Two-Factor Authentication
Three-Factor Authentication
Live Demo: Thumb Scanner
Authentication Protocols
Preventing Impersonation
Identify Proofing
Single Sign-On
Kerberos
Kerberos System Composition
Kerberos Data Types
Kerberos Authentication Process
Kerberos Security Weaknesses
CHAP
EAP
Mutual Authentication

Topic B: Public Key Cryptography
Cryptography
ROT13 Cipher
Keys
Symmetric Encryption in Action
Public Key Cryptography
Asymmetric Encryption in Action
Public Key Cryptography Characteristics
Public Key Infrastructure
Demo: Public Key Infrastructure
Setup and Initialization Phase
Administration Phase
Cancellation and History Phase

Topic C: Remote Access
AAA
RADIUS
RADIUS Authentication
Realms
RADIUS Security
RADIUS Benefits
Diameter
Diameter Improvements
LDAP and Remote Access
LDAP Security
LDAP Authentication/Authorization
TACACS+
TACACS+ vs. RADIUS
802.1x
Virtual Private Networks
VPN Technologies
VPN Security Models
VPN Protocols
PPTP vs. L2TP
IPSec Protocols
Encryption Modes
Secure Shell (SSH)
VPN Solutions
Service Provider Tunneling

**Topic D: Wireless Security**

802.11 Standard
Wireless Security
Wireless Vulnerabilities
Wi-Fi Scanners
Warchalking Symbols
Module 09 - Review

**Module 10 – Monitoring**

**Topic A: Monitoring Resources**

Resource Overview
Performance Monitor
Performance Objects
Demo: Performance Monitor
Bottlenecks
Configuration
Data Collector Sets
Data Collector Set Reports
Demo: Data Collector Sets
Reliability Monitor
Remote Desktop
Remote Desktop Options
Remote Desktop Connection
Demo: Remote Desktop

**Topic B: Event Viewer**

Event Viewer
Event Information
Event Types
Remote Logs
Event Forwarding
Demo: Event Forwarding
Source Computers
Collecting Computers
Subscriptions
Device and Application Logging
Module 10 - Review
Module 11 – Troubleshooting

Topic A: Troubleshooting Basics
Troubleshooting
Information Gathering
Identify the Affected Area
Determine If Anything Has Changed
Establish Probable Cause
Determine If Escalation Is Necessary
Create an Action Plan
Implement and Test a Solution
Identify Results and Effects
Document Problem and Solution
Problem and Resolution Tracking
Hardware Toolkit
Live Demo: Multimeter
Additional Tools
Software Toolkit

Topic B: Troubleshooting The Network
Troubleshooting Wired Connections
Cable Testing Devices
Physical Cable Tests
Live Demo: Troubleshooting
Network Function Tests
Network Analyzer
Troubleshooting Wireless
TCP/IP Utilities
IPConfig
Unix IFConfig
Ping
Ping Troubleshooting
NSLookup and Tracert
Windows Network Diagnostics
Demo: Troubleshooting Connections
Demo: Network Diagnostic

Topic C: Troubleshooting Scenarios
Remote Desktop Components
Module 11 - Review
Course Closure

Total Duration: 25 hrs 53 min