

Course Name: TCP/IP Networking Fundamentals

Course Overview:

This course will provide the necessary base knowledge of TCP/IP protocols and fundamentals to ensure a solid foundation in basic networking principles. The course will cover networking protocols, networking equipment, software, security maintenance and troubleshooting.

Course Length: 3 Days

Who should attend?

- Anyone who is responsible for maintaining or troubleshooting IP networks or equipment
- Junior network administrators
- Residential/Small Business Technicians requiring IP knowledge
- Cable Field Technicians responsible for networking equipment
- Telephone Field Technicians requiring IP knowledge
- Utility Communications Technicians requiring IP knowledge

You will learn:

- The Fundamentals of TCP/IP Networking
- The Fundamentals of IP Addressing
- How to Secure a Network
- How to Test, Maintain and Troubleshoot a Network
- How to deploy Network Hardware and Software
- The Fundamentals of Wireless Networking
- How to Troubleshooting Network Problems

Prerequisites: none

Customizable Course: Yes

Course Content:

Introduction to TCP/IP Networking

What is a TCP/IP Network

- Components of the network
- Network Topologies
- What protocols are used in a TCP/IP network
- Applications for TCP/IP networks

How Computers Communicate on the Network



The OSI Model

- 7 Layers
- Protocols working at each level
- Combining Layers
- Understanding how the layers communicate on the network
- Bringing it all together – watching the layers work on the network

TCP/IP and IP Addressing Basics

IP Addressing

- IP Addressing Basics
- IP Address Classes
- Subnetting
- DHCP
- DNS
- NAT and PAT

TCP/IP Networking

- TCP Protocol
- UDP Protocol
- Guaranteed and Best Effort Traffic

The Internet and Its Applications

Basic Internet Functionality

- How the Internet works
- Web Hosts and Web Browsing
- Email Applications
- Peer-to-peer sharing

Local Area Network Basics

Ethernet

- Ethernet's History
- Why we use Ethernet
- Ethernet Cables and connectors
- Ethernet Fundamentals
- MAC Addressing
- Reducing collisions on Ethernet

LAN Switching

- Switches – the Role they Play in the Network
- Switching Basics
- Switching Hardware
- Setting up VLANs
- Spanning Tree – Preventing Loops in the network



LAN Routing

- Routers – the Role they Play in the Network
- Routing Basics
- Routing Hardware
- Bridging Networks
- Routers and Switches Working Together

Wide Area Network Basics

WAN Technologies

- WAN Services
- Broadband Technologies
- VPNs (Virtual Private Networks)
- Optical Technologies
- Extending the Network

Network Availability and Quality

Understanding Network Services and Quality needs

- Network Uptime
- Web Server Requirements
- VPN User Expectations
- International Presence
- QoS Issues and Concerns
- Network Maintenance Windows
- Network Redundancy
- Disaster Recovery

Network Management

Maintaining the Network

- Network Monitoring and Remote Access
- Network Monitoring Tools
- Network Documentation
- Network Management Protocols
- Network Troubleshooting Tools
- Common Network Problems and Solutions

Securing the Network

Security

- The Need for Network Security
- Authentication and Identity
- Creating User Accounts, Privileges and Restrictions



- Firewalls
- Configure Anti-virus and Spyware Removers
- Port Forwarding Considerations
- Manage Bandwidth usage and Analyze User Data
- URL Filtering
- Enforcing Security Policies

Network Convergence

Unifying Network Communications

- VoIP
- QoS
- Video Conferencing
- IP Video Surveillance
- Multicast and IPTV Broadcasts across the Network

Extending the Reach of the Network

An Introduction to Wireless Networking

- What is a WLAN
- Wireless Standards
- Wireless Hardware and Software
- Designing the Wireless Network
- Performing a Site Survey
- WLAN Monitoring Tools
- Securing the Wireless Network
- Setting up Wireless Access Accounts

Testing and Troubleshooting Common Network Problems

Network Troubleshooting

- Configuration Problems
- Replacing Hardware
- Software installation issues
- IP Addressing and Routing issues
- Virus Removal
- Spyware Removal
- Wireless Interference Problems
- Slow throughput and Bandwidth issues
- Network connection problems
- Network Resource Sharing issues

