

## Course 746: TCP/IP Networking Foundations (4 days)

### Course Description...

In this essential hands-on course, students learn the foundations of TCP/IP Networking. This course covers the essentials of TCP/IP in a Network Environment. Labs are presented using real-world scenarios, including a mixture of Windows, Unix/Linux, and Cisco Operating Systems. The course begins with building a network from just a pile of cables, and ends with teams of students building a multi-segment TCP/IP network.

### Who should attend...

This will benefit System and Network Administrators, Managers, Developers and others on the network who need to have a foundation knowledge and exposure to TCP/IP. Usage of multiple platforms, including Windows, Unix/Linux and Cisco is essential to becoming more effective with TCP/IP, and this course includes them all.

### Suggested Prerequisites...

- This course has no pre-requisites, except a desire to learn TCP/IP

### Course Outline...

#### **Chapter 1: Introduction to TCP/IP Networks**

History of TCP/IP and the Internet  
What does TCP/IP do?  
ISO/OSI model  
Internet RFCs and Standards  
ARPA, IANA and the InterNIC

#### **Chapter 2: Layers 1 and 2 of the Network (Physical and Data Link)**

Networking Requirements  
Physical Cabling and Connectors  
Media Access Control  
*Workshop: Building the Classroom Network*  
Internet Service Provider Technologies  
Wireless Networking  
*Workshop: Connecting to a Wireless Network*

#### **Chapter 3: Layer 3 of the Network (Network)**

The IP Address: Network and Host ID  
IP Address Classes and Private Address Ranges  
Subnetting/Supernetting/Classless Inter-Domain Routing (CIDR)  
Basic Network Routing



## ***Workshop: Configure TCP/IP Networking on Windows and UNIX***

Automatic Address Assignment: DHCP

IP Address to MAC Address resolution

Name to IP Address resolution: Configuration files and DNS

## ***Workshop: Network Testing and Address Resolution***

## **Chapter 4: Layer 4 of the Network (Transport)**

Connection-Oriented Communication (TCP) vs Connection-less Communication (UDP)

Understanding TCP and UDP Ports

## ***Workshop: Identifying Port and Protocol Usage***

Network Address Translation (NAT) and Port Address Translation (PAT)

Proxy Connections

## ***Workshop: Using NAT, PAT and Proxy Servers***

## **Chapter 5: Layer 5 and Above (Session, Presentation and Application)**

File Transfer: FTP, Anonymous FTP, and TFTP

Terminal Connections: Telnet and SSH

## ***Workshop: Transfer Data and Files between systems***

Web Services: HTTP and HTTPS

Messaging: SMTP, POP3 and IMAP4

## ***Workshop: Using Web Services and Messaging Technologies***

Examining OS Specific Protocols: SMB, NetBIOS, CIFS and NFS

## **Chapter 6: TCP/IP Troubleshooting**

Connectivity Testing: ping, tracert, and netstat

Address Resolution: arp and nslookup

IP Address Reverse Lookup

## ***Workshop: TCP/IP Troubleshooting***

Packet Capture and Analysis

Deconstructing TCP/IP Communication

## ***Workshop: TCP/IP Packet Capture and Analysis***

Simple Network Management Protocol (SNMP)

## **Chapter 7: IP Routing**

IP Address Review

LAN-to-LAN Communication

Routing Protocols: Static, RIP, OSPF

Basic Router Configuration

Address and Port Filtering

## ***Workshop: Basic Cisco Router Configuration***

How does Internet Routing work?

## **Chapter 8: IPv6 and Beyond**

Introduction to IPv6

IPv6 Addressing Basics

IPv4 and IPv6 Co-existence

## ***Workshop: Configure a server for IPv6 Communication***

***Please contact your ROI representative to discuss course tailoring!!!***