



TCP/IP Networking E-Learning

Duration: 1 Days **Course Code: E-GK9025**

Overview:

TCP/IP is the globally accepted group of protocols at the core of the Internet and organizational intranets. A solid understanding of each of these protocols and how they work will give you the ability to deploy the most effective network for your organization. In this course, you will gain the essential knowledge and skills required to set up, configure, support, and troubleshoot your TCP/IP-based network. Our expert instructors and extensive hands-on labs will prepare you to face and overcome the challenges of today's complex networks. This course-the longest running of its kind in the industry-also prepares you for more specialized courses in network security, wireless integration, and Voice over IP, as well as for product-specific training such as Cisco, Avaya, and Microsoft.

Target Audience:

Anyone who is responsible for designing, installing, configuring, and maintaining TCP/IP networks or who needs to understand TCP/IP protocol structures and functions will benefit from this course. This course also provides excellent preparation for more advanced networking training.

Objectives:

- Essential elements of the TCP/IP protocol suite
 - Roles of various devices in a TCP/IP network
 - IP addressing and subnetting, including Variable Length Subnet Masking (VLSM)
 - Functions and relationships of ARP, IP, ICMP, TCP, and UDP
 - Automate address assignment and name resolution using DHCP and DDNS
 - IP routing and the protocols that support it, such as RIP and OSPF
 - How applications like FTP, HTTP, Telnet, and others work in a TCP/IP network
 - Functions of IPv6 and its related protocols
 - Functions and capabilities of multicasting, Voice over IP, instant messaging, and e-mail
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Prerequisites:

- GK3150 Understanding Networking Fundamentals
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Follow-on-Courses:

- Security+ Prep Course (SYO-301)
 - Voice over IP Foundations
 - Wireless LAN Foundations
 - ICND2 - Interconnecting Cisco Network Devices 2
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Content:

1. History and Standards

- Origin of TCP/IP
- ARPANET Requirement Documents
- Collaborative Network Requirements
- One Protocol?
- Documentation and RFCs
- RFC Categories

2. TCP/IP Numbering Systems

- Data Representation
- Converting Binary or Hexadecimal to Decimal
- Practice: Convert Binary to Decimal
- Converting Decimal to Binary or Hexadecimal
- Practice: Convert Decimal to Binary or Hexadecimal
- Converting Hexadecimal to Binary and Binary to Hexadecimal
- Counting
- Guidelines for Determining Base

3. Local Signaling

- Ethernet Addressing
- The Ethernet Header
- CSMA/CD
- Lab Demonstration: The ipconfig /all Command

4. IP Addressing

- A Logical Address
- IP Address Structure
- Private Addressing
- Network Address Translation
- Address Assignment

5. IP Subnets

- A Logical Address
- Multiple Subnets
- Planning for Growth
- WAN Interconnect Formula
- Subnetting Subnets

6. Address Resolution Protocol

- Address Mapping
- ARP Cache
- ARP Restrictions
- ARP Message Fields
- How Else Can ARP Help?
- Lab Demonstration: The arp Command

7. Multicasting

- What Is Multicasting?
- Multicast Groups and IGMP
- Mapping a Class D IP Address to an Ethernet Multicast Address
- Lab Demonstration: Mapping a Class D IP

8. Internet Protocol

- TCP/IP Protocols
- Self-Healing Networking
- IP Header
- Practice: Fragment Bytes Layout
- Practice: Protocol Field
- IP Sample Data Exchanges
- Lab Demonstration: The tracertr and pathping Commands

9. IP Routing

- TCP/IP Protocol
- Routing Function
- The IP Routing Algorithm
- The Routing Table
- Exterior or Interior Protocol
- Routing Information Protocol
- Practice: OSPF vs. RIPv1 vs. RIPv2
- Layer 3 Switching

10. Simple Sessions with User Datagram Protocol

- TCP/IP Protocols
- Host-to-Host Layer Categories
- UDP Header
- Port Basics
- UDP Ports and Sockets
- Applications
- UDP Sample Data Exchanges

11. Robust Sessions with TCP

- TCP/IP Protocols
- TCP Headers
- Practice: Flagging a Session
- TCP Three-Step Handshake
- Congestion and TCP
- Four-Step Session Shutdown
- TCP Sample Session
- Lab Demonstration: The netstat Command

12. Autoconfiguration

- BootP and DHCP
- Manual vs. Automatic Address Assignment
- DHCP New Lease Acquisition Process
- Practice: DHCP New Lease Acquisition Process
- DHCP Scopes and Options
- DHCP in a Routed Network

13. DNS: Names Instead of Numbers

- DNS Overview
- A Distributed Service
- The DNS Tree
- Top-Level Domains
- Practice: Top-Level Domains
- Name Serve

15. Common TCP Applications

- TCP/IP Protocols
- Practice: TCP/IP Protocols
- The Uses of Telnet
- File Transfer Protocol
- E-Mail
- World Wide Web
- Uniform Resource Locator

16. Common UDP Applications

- TCP/IP Protocols
- Practice: UDP Port Number Values
- Trivial File Transfer Protocol
- TFTP Sample Sessions
- Simple Network Management Protocol
- The Structure of Management Information
- Remote Network Monitoring

17. VoIP

- Voice over IP
- User
- Talk to Operator
- Communication Characteristics
- Protocol Standards
- Why VoIP Instead of TDM Voice?
- How VoIP Works
- LANs and WANs

18. Instant Messaging

- Instant Messenger Overview
- Sarbanes-Oxley Act
- Standards

19. Security

- Protocol Limitations
- Disaster Threats
- Solutions
- User Authentication
- Security-Related Protocols and IPSec
- Virtual Private Networks

20. IPv6

- Overview
- Addressing
- Header
- ICMPv6 Types
- IPv6 DNS Operation
- Routing Services and Protocols
- Internet2

- Address to an Ethernet Multicast Address
- How Does It All Work Together?

- DNS Database
- Resource Records
- The Name Resolution Process
- Reversing the Process
- Name and Number Organizations
- Dynamic DNS
- Troubleshooting
- Lab Demonstration: The nslookup Command

14. Dagnostics and Error Reports via ICMP

- ICMP Overview
- ICMP Basics
- ICMP Message Destinations
- ICMP Messages
- Practice: ICMP Message Contents
- ICMP Sample Data Exchanges

Further Information:

For More information, or to book your course, please call us on Head Office 01189 123456 / Northern Office 0113 242 5931

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