ITNT-2310: TCP/IP

Cuyahoga Community College

Viewing: ITNT-2310 : TCP/IP

Board of Trustees:
May 2024

Academic Term:
Fall 2024

Subject Code
ITNT - Info Tech-Networking Software

Course Number:
2310

Title:
TCP/IP

Catalog Description:
Provides knowledge and skills required to setup, configure, use, and support Transmission Control Protocol/Internet Protocol (TCP/IP). Emphasis on Microsoft Windows operating system.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
ITNT-2300 Network Fundamentals or concurrent enrollment, or
departmental approval: equivalent knowledge or skills.

Outcomes

Course Outcome(s):
Define, understand, discuss, explain, and utilize fundamental networking concepts and procedures in a business information systems networking environment using the Open Systems Interconnection (OSI) and Transmission Control Protocol/Internet Protocol (TCP/IP) models, protocols, and technologies.

Essential Learning Outcome Mapping:
Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):
1. Define Transmission Control Protocol/Internet Protocol (TCP/IP), Internet Protocol Version 4/Internet Protocol Version 6 (IPv4/IPv6) and describe the advantages on Windows.
2. Configure Microsoft TCP/IP.
3. Test a TCP/IP configuration with the Packet Internet Groper (PING) and IPCONFIG utilities.
4. Identify the network ID and host ID in IPv4/IPv6.
5. Discuss the future direction of IP addressing with emphasis on IPv6.
6. Explain the function of a subnet mask.
7. Explain Supernetting.
8. Explain the difference between static and dynamic IP routing.
9. Isolate route or network link problems using appropriate utilities.
10. Explain how a Dynamic Host Configuration Protocol (DHCP) client obtains IP addresses from a DHCP server IPv4/IPv6.
11. Understand the use of a DHCP relay agent.
12. Explain how the HOSTS file resolves a host name to an IP address on local and remote networks.

13. Modify the HOSTS file so that host names are resolved correctly.
14. Describe the function of Windows Internet Name Service (WINS).
15. Explain the Windows browsing service.
16. Describe the domain logon, account password changes, and domain synchronization processes.
17. Describe the structure and architecture that make up the Domain Name System (DNS) IPv4/IPv6.
18. Describe the contents of the DNS database files.
19. Explain the purpose of Simple Network Management Protocol (SNMP).
20. Define Management Information Base (MIB).
21. Use Windows utilities for diagnosing problems.
22. Troubleshoot an IP network using TCP/IP utilities.

Methods of Evaluation:

1. Exams
2. Quizzes
3. Lab assignments

Course Content Outline:

1. Introduction to TCP/IP
   a. Origin and History
   b. Standards that oversee TCP/IP
   c. IPv4 and IPv6
   d. Open System Interconnection (OSI) and TCP/IP Models
   e. Protocols, Services, Sockets, and Ports
   f. Encapsulation
   g. Protocol Analysis
2. IP addressing
   a. IPv4
   b. IPv6
   c. Subnetting
3. IP Packet Structures
   a. IPv4 structure and functions
   b. IPv6 structure and functions
   c. IPv6 extensions
   d. Comparing IPv4/IPv6 headers and functions
4. Dynamic host configuration protocol
   a. How DHCP works
   b. IPv4/IPv6 auto addressing
   c. Troubleshooting DHCP
5. Name Resolution on IP Networks
   a. IPv4/IPv6 Domain Name Services (DNS)
   b. Troubleshooting DNS
6. Data Link and Network Layer Protocols
   a. Hardware addressing
   b. Logical addressing
   c. IPv4/IPv6 route resolution process
7. IPv4/IPv6 routing
   a. Routing tables
   b. Routing protocols, characteristics, and considerations
   c. Wide Area Network (WAN) routing
   d. Router security
   e. Troubleshooting routing
8. IPv4/IPv6 Internet Control Message Protocol (ICMP)
   a. Path Maximum Transmission Unit (MTU) discovery
   b. Decoding ICMP packets
9. IPv4/IPv6 Neighbor Discovery
   a. The process
   b. Router discovery
10. Transport Layer Protocols

   a. User Datagram Protocol (UDP)
   b. Transmission Control Protocol (TCP)
11. Deploying IPv6
   a. Planning deployment
   b. Migration from IPv4
12. Securing TCP/IP Environments
   a. Principles of security
   b. Vulnerabilities
   c. Common attacks an entry points

Resources

Bock, L. *Learn Wireshark: A definitive guide to expertly analyzing protocols and troubleshooting networks using Wireshark*. Second. Birmingham, UK: Packt Publishing, 2022.

Carrell, J., Tittel, E., Chappell, L. & Pyles, J. *Guide to TCP/IP*. Fifth. Boston: Cengage, 2017.

Resources Other

Cooper, S. (2023, January 5). *The ultimate guide to TCP/IP*. Comparitech. https://www.comparitech.com/net-admin/ultimate-guide-tcp-ip/

Li, A., Liang, H., & Zou, L. (2023, February 23). *Overview of TCP/IP performance*. Microsoft. https://learn.microsoft.com/en-us/troubleshoot/windows-server/networking/overview-of-tcpip-performance

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