

## NETWORKING I

*Networking I* - describes, explores and demonstrates how a network operates in our everyday lives. The course covers the technical pieces and parts of a network and also societal implications such as security and data integrity. This course offers students the critical information needed for a role as an *Information Technology* professional who support computer networks. Concepts covered include the TCP/IP model, OS administration, designing a network topology, configuring the TCP/IP protocols, managing network devices and clients, configuring routers and switches, wireless technology and troubleshooting. The course has a heavy hands-on component to meet various learning styles.

- DOE Code: 5234
- Recommended Grade Level: Grade 11-12
- Recommended Prerequisites: Information Technology Support
- Credits: 1-3 credits per semester, maximum of 2 semesters, maximum of 6 credits
- Counts as a Directed Elective or Elective for all diplomas

### **Dual Credit**

This course provides the opportunity for dual credit for students who meet postsecondary requirements for earning dual credit and successfully complete the dual credit requirements of this course. The Dual Credit crosswalk can be accessed [here](#).

### **Application of Content and Multiple Hour Offerings**

Intensive laboratory applications are a component of this course and may be either school based or work based or a combination of the two. Work-based learning experiences should be in a closely related industry setting. Instructors shall have a standards-based training plan for students participating in work-based learning experiences. When a course is offered for multiple hours per semester, the amount of laboratory application or work-based learning needs to be increased proportionally.

### **Career and Technical Student Organizations (CTSOs)**

Career and Technical Student Organizations are considered a powerful instructional tool when integrated into Career and Technical Education programs. They enhance the knowledge and skills students learn in a course by allowing a student to participate in a unique program of career and leadership development. Students should be encouraged to participate in Business Professionals of America or Future Business Leaders of America, the CTSOs for this area.

## Content Standards

### Domain 1 – Networking Technologies

**Core Standard 1:** Students validate network configuration, connectivity, and interoperability for managing successful networks.

#### Standards

- NET-1.1 Identify the seven layers of the OSI model and their functions
- NET-1.2 Identify the purpose of network services
- NET-1.3 Select the appropriate TCP/IP utility when given a troubleshooting scenario
- NET-1.4 Select the appropriate NIC and network configuration settings when given a network configuration
- NET-1.5 Configure the connection for a remote connectivity scenario
- NET-1.6 Identify the basic capabilities of server operating systems
- NET-1.7 Identify the basic characteristics of WAN technologies
- NET-1.8 Describe the purpose and function of ports as they operate at the transport layer
- NET-1.9 Define the purpose, function and/or use of all the protocols within the TCP/IP suite
- NET-1.10 Differentiate between network protocols in terms of routing, addressing schemes, interoperability, and naming conventions

### Domain 2 – Network Media, Topologies, and Troubleshooting

**Core Standard 2:** Students apply and adapt appropriate network media and topologies to maintain a functional network.

#### Standards

- NET-2.1 Choose the appropriate media type and connectors to add a client to an existing network
- NET-2.2 Recognize and identify media connectors and components of wiring distribution systems including description of their uses
- NET-2.3 Specify the characteristics of the various networking media types
- NET-2.4 Compare and contrast the main features of Ethernet, wireless, cellular, and networking technologies
- NET-2.5 Categorize WAN technology types and properties
- NET-2.6 Identify the cause of the problem when given a network-troubleshooting scenario involving a wiring/infrastructure problem and its location in relation to the OSI layers

- NET-2.7 Identify the network area affected and the cause of the problem for a troubleshooting scenario involving a network with a particular physical topology and including a network diagram
- NET-2.8 Identify the cause of the failure in troubleshooting scenario involving a small office/home network failure
- NET-2.9 Select the appropriate NIC and network configuration settings when given a network configuration

### **Domain 3 – Network Devices**

**Core Standard 3:** Students understand the functions of network devices.

#### **Standards**

- NET-3.1 Describe the purpose, features and functions of network components
- NET-3.2 Identify the OSI layers at which networking components operate
- NET-3.3 Identify the basic capabilities of client workstations
- NET-3.4 Setup routers and switches for basic network connectivity through a router and switch configuration process
- NET-3.5 Describe the purpose of subnetting and default gateways
- NET-3.6 Categorize IP addresses (IPv4) and their default subnet masks
- NET-3.7 Explain and demonstrate the IP addressing scheme for IPv4 and IPv6
- NET-3.8 Identify the main purpose of network attached storage
- NET-3.9 Recognize logical or physical network topologies given a schematic diagram or description
- NET-3.10 Determine the nature of the problem for a network scenario when given visual indicators

### **Domain 4 – Network Security**

**Core Standard 4:** Students integrate security in the design and management of networks.

#### **Standards**

- NET-4.1 Categorize different types of network security appliances and methods
- NET-4.2 Explain common threats, vulnerabilities, and mitigation techniques
- NET-4.3 Identify security protocols and describe their purpose and function
- NET-4.4 Define the function of remote access protocols and services

- NET-4.5 Explain the methods of network access security
- NET-4.6 Explain methods of user authentication
- NET-4.7 Identify the purpose, benefits and characteristics of using a proxy
- NET-4.8 Given a scenario, implement appropriate wireless security measures
- NET-4.9 Given a scenario, install and configure a basic firewall

## **Domain 5 – Network Tools**

**Core Standard 5:** Students validate concepts of networking tools to manage and implement networks.

### **Standards**

- NET-5.1 Identify and describe the appropriate tools used by a technician
- NET-5.2 Describe the purpose of configuration management documentation
- NET-5.3 Predict the impact of a particular security implementation on network functionality when given a wiring task
- NET-5.4 Explain different methods and rationales of network performance optimization
- NET-5.5 Use the appropriate tool for a given task
- NET-5.6 Given a scenario, use the appropriate network monitoring resource to analyze traffic

## **Domain 6 – Network Concepts Application**

**Core Standard 6:** Students should be able to demonstrate the ability to plan, configure, and troubleshoot a network.

### **Standards**

- NET-6.1 Build/configure a basic wired and wireless LAN and VLAN with end devices attached
- NET-6.2 Demonstrate the ability to appropriately implement IPv4 and IPv6 addressing schemes, including CIDR/VLSM
- NET-6.3 Demonstrate the ability to monitor various network characteristics
- NET-6.4 Exhibit how to implement security and network optimization in data communications

## **Domain 7 – Network Management**

**Core Standard 7:** Students establish routines and procedures appropriate for network management.

### **Standards**

- NET-7.1 Identify various network services
- NET-7.2 Determine the impact of modifying, adding, or removing network services on network resources and users
- NET-7.3 Configure a client to connect to a server running an identified NOS when given specific parameters
- NET-7.4 Identify the cause of the problem when given a troubleshooting scenario involving a remote connectivity problem
- NET-7.5 Identify the purpose and characteristics of fault tolerance
- NET-7.6 Identify the main characteristics of VLANs
- NET-7.7 Explain different methods and rationales for network performance optimization
- NET-7.8 Describe the purpose of configuration management documentation
- NET-7.9 Identify the purpose and characteristics of disaster recovery