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

Networking I, March 2018, Page 2 of 5
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