

Network Technology (10101)

Rationale Statement:

The goal of this course is to help students recognize the significant impact of computer networking in their lives. Virtually any career involves the use of technology, and familiarity with the concept of computer networking and networking media promotes confidence in the use of computer networking concepts. In addition, this course will instill a sense of awe in students and encourage them to learn more about how things work and consider pursuing a career in Information Systems, Information Technology, Computer Science, or Computer Networking and related fields of Electronics, Cabling, and Telecommunications.

As stated at www.careerclusters.org, "Careers in Network Systems involve network analysis, planning and implementation; including design, installation, maintenance and management of network systems. Successful establishment and maintenance of information technology infrastructure is critical to the success of almost every 21st century organization. People with expertise in Network Systems are in high demand for a variety of positions in organizations of all sizes and types, doing work such as creating and maintaining the infrastructure in medical facilities that enables multiple doctors to view the same patient's X-rays in real-time to determine the diagnosis and the best treatment."

Course Description:

Telecommunications – Networking Fundamentals teaches students the fundamental concepts of networking and networking media. It establishes the relevancy of networking in our everyday lives. It has the added benefit of preparing students for entry-level jobs in the networking industry by employing engaging instructional approaches that help them understand general theory and gain practical experience. There will be opportunities for extensive hands-on interaction with computers, networking equipment, and networking media to prepare students for careers or post-secondary continuing education.

Telecommunications – Networking Fundamentals will prepare students that are planning to attend a two or four year post-secondary school for Information Systems, Information Technology, Computer Science, or Computer Networking and related fields of Electronics, Cabling, and Telecommunications.

Grade Level: 9 – 12

Topics Covered:

- Network Design and Architecture
- Network Configuration
- Network Terminology
- Network Media
- Network Troubleshooting

Core Technical Standards & Examples

Indicator #1: Identify and analyze customer/organizational network system needs and requirements.

Bloom's Taxonomy Level	Standard and Examples
Analyzing	<p>NT 1.1 Gather data to identify customer/organizational requirements. Examples:</p> <ul style="list-style-type: none"> • Identify end-user requirements in order to determine the appropriate media to use. • Identify types of information to gather during a pre-design site survey.
Applying	<p>NT 1.2 Conduct a computer network needs analysis. Examples:</p> <ul style="list-style-type: none"> • Match descriptions of network implementations with the type of technology and/or media needed. • Utilize a network upgrade plan that uses SWOT (identification of strengths, weaknesses, opportunities, and threats) to define project needs.
Creating	<p>NT 1.3 Develop networking requirements specifications Examples:</p> <ul style="list-style-type: none"> • Match end-user requirements to services and connections offered by various ISPs. • Investigate a customer network and create a network inventory list.
Evaluating	<p>NT 1.4 Analyze requirements/specifications using current approaches Examples:</p> <ul style="list-style-type: none"> • Compare and contrast the data on bandwidth needs, existing infrastructure, and Total Cost of Ownership when planning a network. • Identify site and system constraints as part of the site survey process.

Indicator #2: Perform project management

Bloom's Taxonomy Level	Standard and Examples
Evaluating	NT 2.1 Produce strategies and plan to solve the specific networking problem Examples: <ul style="list-style-type: none">• Select a specific troubleshooting approach based on the details of a scenario.• Based on specific scenarios, identify the OSI layer that should be examined.
Creating	NT 2.2 Create a project plan Examples: <ul style="list-style-type: none">• Create a security plan for a network.• Examine an existing floor plan and propose a cable upgrade plan to accommodate extra floor space.
Applying	NT 2.3 Manage information system project methodology Examples: <ul style="list-style-type: none">• Create and utilize checklists.• Identify specific aspects of each phase of a Network Upgrade Plan.

Indicator #3: Analyze network system interdependencies and constraints

Bloom's Taxonomy Level	Standard and Examples
Analyzing	NT 3.1 Analyze the computer site environment Examples: <ul style="list-style-type: none">• Distinguish between the functions of surge suppressors and uninterruptible power supplies.• Assess issues with existing cabling and power supply as part of a site survey.• Read schematics of cabling
Analyzing	NT 3.2 Analyze network security systems Examples: <ul style="list-style-type: none">• Identify the purpose of major security tools as part of a network security policy.• Examine an SLA and practice interpreting the sections of the security policy.
Evaluating	NT 3.3 Evaluate the correctness and effectiveness of implementing the network system Examples: <ul style="list-style-type: none">• Prototype a simple network using a simulation program.• Describe the review and evaluation phase of a network upgrade.

Indicator #4: Demonstrate knowledge of designing a networking system

Bloom's Taxonomy Level	Standard and Examples
Understanding	<p>NT 4.1 Demonstrate knowledge of the basics of network architecture Examples:</p> <ul style="list-style-type: none"> • Match a variety of header addresses, protocols, and terms to the proper layers of the OSI model. • Describe the hierarchical structure of the Internet, and the interconnections providing customers with Internet access.
Understanding	<p>NT 4.2 Demonstrate knowledge of basic network classifications and topologies Examples:</p> <ul style="list-style-type: none"> • Identify elements found in physical and logical network topologies. • Define elements of physical and logical wired and wireless technologies.
Understanding	<p>NT 4.3 Demonstrate knowledge of common network computing platforms Examples:</p> <ul style="list-style-type: none"> • Classify a variety of networking components as media, hosts, peripherals, or devices. • Explore different internetworking device options, and match devices to specific needs.
Applying	<p>NT 4.4 Demonstrate knowledge of LAN physical media Examples:</p> <ul style="list-style-type: none"> • Construct and test both straight through and crossover UTP cables. • Identify, construct, and test different modes of fiber optic cables. • Identify and confirm respective cabling standards, including coaxial cable, UTP, STP, Fiber Optics, and wireless. • Connect a LAN switch to a router.
Applying	<p>NT 4.5 Demonstrate knowledge of network connectivity basis and transmission line applications. Examples:</p> <ul style="list-style-type: none"> • Describe the channel reservation process used on wireless CSMA/CA network • Compare and contrast types of circuits in TSP connections.
Applying	<p>NT 4.6 Demonstrate knowledge of communication standards for networks. Examples:</p> <ul style="list-style-type: none"> • Distinguish between the capabilities of the currently available range of wireless LAN standards. • Suggest appropriate WAN connections based on a match between connection standard and user requirements.

Analyzing	NT 4.7 Demonstrate knowledge of WAN systems. Examples: <ul style="list-style-type: none"> • Compare and contrast various options for WAN access through an ISP. • Configure a serial interface on routers for communication.
Applying	NT 4.8 Demonstrate knowledge of network security systems. Examples: <ul style="list-style-type: none"> • Configure firewall settings on a GUI interface to create a DMZ. • Use Windows permissions to secure local data on a host.
Analyzing	NT 4.9 Demonstrate knowledge of Network Operating Systems. Examples: <ul style="list-style-type: none"> • Contrast the features of an OS and a NOS. • Examine the interface of a Windows DNS server to view the cached information from a DNS lookup.

Indicator #5: Perform network system installation and configuration

Bloom's Taxonomy Level	Standard and Examples
Applying	NT 5.1 Install a system Examples: <ul style="list-style-type: none"> • Install physical media including rough-in, trim-out, and finish phases • Determine the appropriate operating system installation technique for a given scenario. • Utilize software help facilities in the Cisco IOS CLI.
Applying	NT 5.2 Perform software loading and configuration Examples: <ul style="list-style-type: none"> • Identify elements needed for logical device naming and addressing. • Using a Windows server, create primary and secondary DNS zones.

Indicator #6: Perform network administration and monitoring

Bloom's Taxonomy Level	Standard and Examples
Evaluating	NT 6.1 Monitor the information/network system Examples: <ul style="list-style-type: none">• Examine IP configuration information on a host by using ipconfig.• Download, install, and then conduct a network capture with a network snooping application.
Applying	NT 6.2 Demonstrate knowledge of disaster recovery and business continuance. Examples: <ul style="list-style-type: none">• Follow best practices before installing OS software in order to avoid possible data loss.• Match disaster recovery planning steps to correct disaster recovery procedures.
Applying	NT 6.3 Perform network system administration tasks. Examples: <ul style="list-style-type: none">• Describe a logical device naming convention.• Configure and verify RIP.

Indicator #7: Perform network maintenance and user support services

Bloom's Taxonomy Level	Standard and Examples
Analyzing	NT 7.1 Identify technical support needed. Examples: <ul style="list-style-type: none">• Match devices found at an ISP NOC with the support requirements they fulfill.• Identify the responsibilities of each level of ISP technician.
Applying	NT 7.2 Perform technical support needed. Examples: <ul style="list-style-type: none">• Install a printer and verify its operation.• Match help desk actions to the parts of the customer support process.
Creating	NT 7.3 Perform software upgrades and fixes. Examples: <ul style="list-style-type: none">• Determine from a given scenario the type of OS patch or update needed.• Recommend an Anti-X software package for a small business.

Applying	NT 7.4 Perform standard computer backup procedures. Examples: <ul style="list-style-type: none">• Back up and restore configurations using the GUI.• Plan a backup solution for a small business.
Applying	NT 7.5 Perform network system maintenance. Examples: <ul style="list-style-type: none">• Update an access point with the latest version of firmware.• Perform data security tasks needed to secure local data and transmitted data.
Evaluating	NT 7.6 Troubleshoot problems. Examples: <ul style="list-style-type: none">• Identify the troubleshooting technique used in a given scenario.• Match a network troubleshooting issue with the appropriate OSI layer.
Evaluating	NT 7.7 Troubleshoot data communications. Examples: <ul style="list-style-type: none">• Assign different IP addresses on a peer-to-peer network, and view the effects on network communication.• Troubleshoot and resolve a network communication issue.