

Florida Department of Education
Curriculum Framework

Program Title: Network Support Services
Program Type: Career Preparatory
Career Cluster: Information Technology

Career Certificate Program

Program Number	B078000
CIP Number	0511090102
Grade Level	30, 31
Standard Length	1050 hours
Teacher Certification	Refer to the Program Structure section.
CTSO	Phi Beta Lambda BPA
SOC Codes (all applicable)	15-1151 – Computer User Support Specialists 15-1142 – Network and Computer Systems Administrators 15-1143 – Computer Network Architects
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml
Basic Skills Level	Mathematics: 9 Language: 9 Reading: 9

Purpose

This program offers a sequence of courses that provides coherent and rigorous content aligned with challenging academic standards and relevant technical knowledge and skills needed to prepare for further education and careers in network support services positions in the Information Technology career cluster; provides technical skill proficiency, and includes competency-based applied learning that contributes to the academic knowledge, higher-order reasoning and problem-solving skills, work attitudes, general employability skills, technical skills, and occupation-specific skills, and knowledge of all aspects of the Information Technology career cluster. This program offers a broad foundation of knowledge and skills to prepare students for employment.

The content includes but is not limited to instruction in computer literacy; software application support; basic hardware configuration and troubleshooting; networking technologies, troubleshooting, security, and administration; and customer service and human relations skills.

Additional Information relevant to this Career and Technical Education (CTE) program is provided at the end of this document.

Program Structure

This program is a planned sequence of instruction consisting of seven occupational completion points.

This program is comprised of courses which have been assigned course numbers in the SCNS (Statewide Course Numbering System) in accordance with Section 1007.24 (1), F.S. Career and Technical credit shall be awarded to the student on a transcript in accordance with Section 1001.44(3)(b), F.S.

To teach the courses listed below, instructors must hold at least one of the teacher certifications indicated for that course.

The following table illustrates the postsecondary program structure:

OCP	Course Number	Course Title	Teacher Certification	Length	SOC Code
A	OTA0040	Information Technology Assistant	OTA0040 Teacher Certifications	150 hours	15-1151
B	EEV0504	Computer Support Assistant	BUS ED 1 @2 COMPU SCI 6 COMP SVC 7G CYBER TECH 7G INFO TECH 7G	150 hours	15-1151
C	CTS0022	Network Support Help Desk Assistant		150 hours	15-1142
D	CTS0023	Network Support Administrator		150 hours	15-1142
E	CTS0024	Senior Network Administrator		150 hours	15-1143
F	CTS0029	Wireless Network Administrator		150 hours	15-1143
G	EEV0317	Data Communications Analyst		150 hours	15-1143

Common Career Technical Core – Career Ready Practices

Career Ready Practices describe the career-ready skills that educators should seek to develop in their students. These practices are not exclusive to a Career Pathway, program of study, discipline or level of education. Career Ready Practices should be taught and reinforced in all career exploration and preparation programs with increasingly higher levels of complexity and expectation as a student advances through a program of study.

1. Act as a responsible and contributing citizen and employee.
2. Apply appropriate academic and technical skills.
3. Attend to personal health and financial well-being.
4. Communicate clearly, effectively and with reason.
5. Consider the environmental, social and economic impacts of decisions.
6. Demonstrate creativity and innovation.
7. Employ valid and reliable research strategies.
8. Utilize critical thinking to make sense of problems and persevere in solving them.
9. Model integrity, ethical leadership and effective management.
10. Plan education and career path aligned to personal goals.
11. Use technology to enhance productivity.
12. Work productively in teams while using cultural/global competence.

Standards

Information Technology Assistant (OTA0040) is the first course in this and other programs within the Information Technology Career Cluster. Standards 01.0 – 14.0 are associated with this course.

After successfully completing this program, the student will be able to perform the following:

- 1.0 Demonstrate knowledge, skill, and application of information systems to accomplish job objectives and enhance workplace performance.
- 2.0 Develop an awareness of microprocessors and digital computers.
- 3.0 Demonstrate an understanding of operating systems.
- 4.0 Use technology to enhance the effectiveness of communication skills utilizing word processing applications.
- 5.0 Use technology to enhance communication skills utilizing presentation applications.
- 6.0 Use technology to enhance the effectiveness of communication utilizing spreadsheet and database applications.
- 7.0 Use technology to enhance communication skills utilizing electronic mail.
- 8.0 Investigate individual assessment and job/career exploration and individual career planning that reflect the transition from school to work, lifelong learning, and personal and professional goals.
- 9.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
- 10.0 Demonstrate competence using computer networks, internet and online databases to facilitate collaborative or individual learning and communication.
- 11.0 Demonstrate competence in page design applicable to the WWW.
- 12.0 Develop an awareness of emerging technologies.
- 13.0 Develop awareness of computer languages and software applications.
- 14.0 Demonstrate comprehension and communication skills.
- 15.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
- 16.0 Identify, install, configure, and upgrade desktop and server computer modules and peripherals, following established basic procedures for system assembly and disassembly of field replaceable modules.
- 17.0 Diagnose and troubleshoot common module problems and system malfunctions of computer software, hardware, peripherals, and other office equipment.
- 18.0 Identify issues, procedures and devices for protection within the computing environment, including people, hardware and the surrounding workspace.
- 19.0 Identify specific terminology, facts, ways and means of dealing with classifications, categories and principles of motherboards, processors and memory in desktop and server computer systems.
- 20.0 Demonstrate knowledge of basic types of printers, basic concepts, printer components, how they work, how they print onto a page, paper path, care and service techniques, and common problems.
- 21.0 Identify and describe basic network concepts and terminology, ability to determine whether a computer is networked, knowledge of procedures for swapping and configuring network interface cards, and knowledge of the ramifications of repairs when a computer is networked.
- 22.0 Perform end user support and assistance by troubleshooting and diagnosing through telephone, e-mail, remote access, or direct contact.

- 23.0 Demonstrate proficiency using graphical user interface (GUI) operating systems.
- 24.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
- 25.0 Perform end user support and assistance by troubleshooting and diagnosing through telephone, e-mail, remote access, or direct contact.
- 26.0 Understand, describe, and explain internet connections.
- 27.0 Define networking terminology.
- 28.0 Explain how to connect copper media, optical media, and wireless media.
- 29.0 Perform tasks related to the network cable testing and cable making.
- 30.0 Define network topologies, devices and connections.
- 31.0 Define Ethernet fundamentals and operations.
- 32.0 Define and explain the functions of bridges and switches.
- 33.0 Explain the mathematical concepts and protocols behind the internet.
- 34.0 Define and explain the difference between routed and routing protocols.
- 35.0 Recognize, define, and explain functions of the transport layer.
- 36.0 Explain, define, and identify the components of a WAN and router.
- 37.0 Describe and identify an operating system for a router.
- 38.0 Explain how to establish connections between neighboring routers.
- 39.0 Identify and explain the router boot sequence and file system.
- 40.0 Identify and explain static and dynamic routing protocols.
- 41.0 Describe and configure distance vector protocols.
- 42.0 Perform tasks related to protocol troubleshooting.
- 43.0 Examine and test networks.
- 44.0 Define, explain and describe access lists.
- 45.0 Solve problems using critical thinking skills, creativity and innovation.
- 46.0 Use information technology tools.
- 47.0 Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment.
- 48.0 Describe the importance of professional ethics and legal responsibilities.
- 49.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
- 50.0 Participate in simulated work-based learning experiences.
- 51.0 Provide network support and assistance by troubleshooting and diagnosing through direct contact remote access.
- 52.0 Perform logical and physical network design activities.
- 53.0 Demonstrate proficiency in selecting appropriate various routing protocols and IP routing configuration for various network designs.
- 54.0 Demonstrate proficiency in using network traffic filtering to improve network performance and provide basic levels of security.
- 55.0 Perform network management activities related to documentation, security, performance, administration, troubleshooting and coping with environmental factors.
- 56.0 Identify and describe various wan functions, devices, and demonstrate understanding of the wan design process.
- 57.0 Describe the operation and implementation of virtual private networks.
- 58.0 Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
- 59.0 Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.

- 60.0 Explain the importance of employability skill and entrepreneurship skills.
- 61.0 Demonstrate personal money-management concepts, procedures, and strategies.
- 62.0 Participate in simulated work-based learning experiences.
- 63.0 Compare and contrast hierarchical network design models and scalable internetworks.
- 64.0 Discuss advanced IP addressing management.
- 65.0 Demonstrate proficiency in basic router configuration.
- 66.0 Demonstrate proficiency in the use of OSPF.
- 67.0 Understand and discuss multi-area OSPF operation and configuration.
- 68.0 Demonstrate the use of stub and totally stubby areas.
- 69.0 Demonstrate proficiency in route optimization.
- 70.0 Demonstrate proficiency in the use of BGP.
- 71.0 Define and show proficiency in security.
- 72.0 Use lab equipment, demonstrate the setup, configuration, connectivity of routers to create a small WAN.
- 73.0 Configure and monitor DSL and DDR.
- 74.0 Demonstrate the use of scaling IP addresses with NAT.
- 75.0 Demonstrate proficiency using Authentication, Authorization & Accounting AAA to scale access control.
- 76.0 Understand and describe key characteristics of various switching technologies, LAN switching and the hierarchical model of network design, and the 3-tier model.
- 77.0 Understand and describe campus networks, design models, and switching technologies.
- 78.0 Show proficiency configuring a switch.
- 79.0 Demonstrate proficiency configuring VLANs.
- 80.0 Understand and explain spanning tree protocol (STP) and redundant links.
- 81.0 Demonstrate proficiency with multilayer switching.
- 82.0 Demonstrate the use of hot standby routing protocol (HSRP).
- 83.0 Understand and use IGMP and multicasting.
- 84.0 Demonstrate proficiency restricting network access.
- 85.0 Demonstrate proficiency using network troubleshooting tools and basic network management diagnostic tools.
- 86.0 List and define the commonly used protocols, routing techniques, and switching processes.
- 87.0 Demonstrate proficiency troubleshooting TCP/IP, LAN switch environment, VLANs, frame relay, and ISDN.
- 88.0 Participate in simulated work-based learning experiences.
- 89.0 Demonstrate proficiency in applying radio frequency (RF) technologies.
- 90.0 Develop an awareness of wireless LAN technologies.
- 91.0 Perform implementation and management activities.
- 92.0 Develop an awareness of wireless security systems.
- 93.0 Demonstrate knowledge of wireless industry standards.
- 94.0 Participate in simulated work-based learning experiences.
- 95.0 Demonstrate knowledge of general security concepts.
- 96.0 Develop an awareness of communication security concepts.
- 97.0 Develop an awareness of network infrastructure security.
- 98.0 Develop an awareness of cryptography and its relation to security.
- 99.0 Incorporate organizational and operational security in an appropriate and effective manner.

100.0

2020 – 2021

**Florida Department of Education
Student Performance Standards**

**Program Title: Network Support Services
Career Certificate Program Number: B078000**

**Course Number: OTA0040
Occupational Completion Point: A
Information Technology Assistant – 150 Hours – SOC Code 15-1151**

Information Technology Assistant (OTA0040) is part of several programs across the various CTE career clusters. To ensure consistency, the standards and benchmarks for this course (01.0 – 14.0) have been placed in a separate document. To access this document, visit: [Information Technology Assistant \(OTA0040\)](#) - (RTF)

Course Number: EEV0504

Occupational Completion Point: B

Computer Support Assistant – 150 Hours – SOC Code 15-1151

15.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance. The student will be able to:
15.1	Develop strategies for resolving customer conflicts.
16.0	Identify, install, configure, and upgrade desktop and server computer modules and peripherals, following established basic procedures for system assembly and disassembly of field replaceable modules. The student will be able to:
16.1	Identify and describe the functions of main processing boards.
16.2	Identify and describe the functions of communication ports.
16.3	Identify and describe the functions of peripheral devices.
16.4	Identify and describe the components of portable systems.
16.5	Troubleshoot, install and upgrade computers and peripherals.
16.6	Perform system hardware setup.
16.7	Demonstrate an understanding of input/output devices.
16.8	Installation and configuration of applications software, hardware, and device drivers.
16.9	Demonstrate an understanding of the operation and purpose of hardware components.
16.10	Install operating system software.
16.11	Customize operating systems.
16.12	Install application software.
16.13	Perform storage formatting and preparation activities.
16.14	Identify data measurement.
16.15	Install and configure RAID.
16.16	Recognize and report on server room environmental issues.
17.0	Diagnose and troubleshoot common module problems and system malfunctions of computer software, hardware, peripherals, and other office equipment. The student will be able to:

17.1	Troubleshoot a personal computer system.
17.2	Identify configuration problems.
17.3	Identify software problems.
17.4	Identify hardware malfunctions.
17.5	Identify network malfunctions.
17.6	Resolve computer error messages.
17.7	Understand and troubleshoot memory and cache systems.
17.8	Verify that drives are the appropriate type.
17.9	Describe knowledge database search procedures used to identify possible solutions when troubleshooting software and hardware problems.
18.0	Identify issues, procedures and devices for protection within the computing environment, including people, hardware and the surrounding workspace. The student will be able to:
18.1	Apply basic rules for hardware safety.
18.2	Demonstrate proficiency in basic preventative hardware maintenance.
18.3	Special disposal procedures that comply with environmental guidelines for batteries, CRTs, toner kits/cartridges, chemical solvents and cans, and MSDS.
18.4	Apply ergonomic principles applicable to the configuration of computer workstations.
18.5	Describe ethical issues and problems associated with computers and information systems.
19.0	Identify specific terminology, facts, ways and means of dealing with classifications, categories and principles of motherboards, processors and memory in desktop and server computer systems. The student will be able to:
19.1	Identify Random Access Memory (RAM) types.
19.2	Identify I/O ports and devices.
20.0	Demonstrate knowledge of basic types of printers, basic concepts, printer components, how they work, how they print onto a page, paper path, care and service techniques, and common problems. The student will be able to:
20.1	Identify types of printers.
20.2	Identify care and service techniques and common problems with primary printer types.
20.3	Implement and manage printing on a network.

21.0	Identify and describe basic network concepts and terminology, ability to determine whether a computer is networked, knowledge of procedures for swapping and configuring network interface cards, and knowledge of the ramifications of repairs when a computer is networked. The student will be able to:
21.1	Define networking and describe the purpose of a network.
21.2	Identify the purposes and interrelationships among the major components of networks.
21.3	Describe the various types of network topologies.
21.4	Identify and describe the purpose of standards, protocols, and the Open Systems Interconnection (OSI) reference model.
21.5	Configure network and verify network connectivity.
21.6	Discuss the responsibilities of the network.
21.7	Develop user logon procedures.
21.8	Utilize network management infrastructures to perform administrative tasks.
21.9	Identify common backup strategies and procedures.
21.10	Select and use appropriate electronic communications software and hardware for specific tasks.
21.11	Compare and contrast Internet software and protocols.
21.12	Diagnose and resolve electronic communications operational problems.
21.13	Design and implement directory tree structures.
21.14	Install services tools.
21.15	Perform and verify backups.
21.16	Identify bottlenecks.
21.17	Use the concepts of fault tolerance/fault recovery to create a disaster recovery plan.
21.18	Document and test disaster recovery plan regularly, and update as needed.
22.0	Perform end user support and assistance by troubleshooting and diagnosing through verbal or written communication. The student will be able to:
22.1	Apply call center vocabulary.
22.2	Listen and input information simultaneously.
22.3	Apply first response assistance for minor repair work.

23.0	Demonstrate proficiency using graphical user interface (GUI) operating systems. The student will be able to:
23.1	Identify parts of GUI windows.
23.2	Demonstrate proficiency in using menu systems.
23.3	Demonstrate proficiency in using pointing and selection devices.
23.4	Identify keyboard shortcuts and special function keys.
23.5	Demonstrate proficiency in manipulating windows.
23.6	Utilize help systems and hypertext links.
23.7	Create, organize, and maintain file system directories.
23.8	Organize desktop objects.
23.9	Run multiple applications.

Course Number: CTS0022
Occupational Completion Point: C
Network Support Help Desk Assistant – 150 Hours – SOC Code 15-1142

24.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance. The student will be able to:
24.1	Develop diplomatic methods to communicate with customers.
25.0	Perform end user support and assistance by troubleshooting and diagnosing through verbal or written communication. The student will be able to:
25.1	Apply first response assistance for minor repair work.
26.0	Understand, describe, and explain internet connections. The student will be able to:
26.1	Understand the physical connectivity necessary for a computer to connect to the Internet.
26.2	Recognize the primary components of a computer.
26.3	Install and troubleshoot network interface cards and/or modems.
26.4	Use basic testing procedures to test the Internet connection.
26.5	Demonstrate a basic understanding of the use of web browsers and plug-ins.
27.0	Define networking terminology. The student will be able to:
27.1	Explain the importance of bandwidth in networking.
27.2	Identify bps, kbps, Mbps, and Gbps as units of bandwidth.
27.3	Explain the difference between bandwidth and throughput.
27.4	Explain the development of the Open System Interconnection model (OSI).
27.5	List the advantages of a layered approach.
27.6	Identify each of the seven layers of the OSI model.
27.7	Identify the four layers of the TCP/IP model.
27.8	Describe the similarities and differences between the two models.
27.9	Briefly outline the history of networking.
27.10	Identify devices used in networking.

27.11	Understand the role of protocols in networking.
27.12	Define types of area networks.
27.13	Explain VPNs and their advantages.
27.14	Describe the differences between intranets and extranets.
28.0	Explain how to connect copper media, optical media, and wireless media. The student will be able to:
28.1	Discuss the electrical properties of matter.
28.2	Define voltage, resistance, impedance, current, and circuits.
28.3	Describe the specifications and performances of different types of cable.
28.4	Describe coaxial cable and its advantages and disadvantages over other types of cable.
28.5	Describe shielded twisted-pair (STP) cable and unshielded twisted-pair cable (UTP) and its uses.
28.6	Discuss the characteristics of straight-through, crossover, and rollover cables and where each is used.
28.7	Explain the basics of fiber-optic cable.
28.8	Describe how fibers can guide light for long distances.
28.9	Describe multimode and single-mode fiber.
28.10	Describe how fiber is installed.
28.11	Describe the type of connectors and equipment used with fiber-optic cable.
28.12	Explain how fiber is tested to ensure that it will function properly.
28.13	Discuss safety issues dealing with fiber-optics.
29.0	Perform tasks related to network cable testing and cable making. The student will be able to:
29.1	Differentiate between sine waves and square waves.
29.2	Define basic terminology related to time, frequency, and noise.
29.3	Differentiate between digital bandwidth and analog bandwidth.
29.4	Compare and contrast noise levels on various types of cabling.
29.5	Define and describe the effects of attenuation and impedance mismatch.

29.6	Define crosstalk, near-end crosstalk, far-end crosstalk, and power sum near-end crosstalk.
29.7	Describe how crosstalk and twisted pairs help reduce noise.
29.8	Describe the ten copper cable tests defined in TIA/EIA-568-A/B.
29.9	Describe the difference between Category 5 and Category 6 cable.
30.0	Define network topologies, devices and connections. The student will be able to:
30.1	Identify characteristics of Ethernet networks.
30.2	Identify straight-through, crossover, and rollover cable.
30.3	Describe various intermediary network devices.
30.4	Describe the function of peer-to-peer networks.
30.5	Describe the function, advantages, and disadvantages of client-server networks.
30.6	Describe and differentiate between serial, digital subscriber line (DSL), and cable modem WAN connections.
30.7	Identify router serial ports and their cable and connectors.
30.8	Identify and describe the placement of equipment used in various WAN configurations.
31.0	Define Ethernet fundamentals and operations. The student will be able to:
31.1	Describe the basics of Ethernet technology.
31.2	Explain naming rules of Ethernet technology.
31.3	Define how Ethernet and the OSI model interact.
31.4	Describe the Ethernet framing process and frame structure.
31.5	List Ethernet frame field names and purposes.
31.6	Identify the characteristics of CSMA/CD.
31.7	Describe the key aspects of Ethernet timing, interframe spacing and backoff time after a collision.
31.8	Define Ethernet errors and collisions.
31.9	Explain the concept of auto-negotiation in relation to speed and duplex.
32.0	Define and explain the functions of bridges and switches. The student will be able to:

32.1	Define bridging and switching.
32.2	Define and describe the content-addressable memory (CAM) table.
32.3	Define latency.
32.4	Describe store-and forward and cut-through switching modes.
32.5	Explain Spanning-Tree Protocol (STP).
32.6	Define collisions, broadcasts, collision domains, and broadcast domains.
32.7	Identify the Layer 1, 2, and 3 devices used to create collision domains and broadcast domains.
32.8	Discuss data flow and problems with broadcasts.
32.9	Explain network segmentation and list the devices used to create segments.
33.0	Explain the mathematical concepts and protocols behind the internet. The student will be able to:
33.1	Explain why the Internet was developed and how TCP/IP fits the design of the Internet.
33.2	List the four layers of the TCP/IP model.
33.3	Describe the functions of each layer of the TCP/IP model.
33.4	Compare the OSI model and the TCP/IP model.
33.5	Describe the function and structure of IP addresses.
33.6	Understand why subnetting is necessary.
33.7	Explain the difference between public and private addressing.
33.8	Understand the function of reserved IP addresses.
33.9	Explain the use of static and dynamic addressing for a device.
33.10	Use ARP to obtain the MAC address to send a packet to another device.
33.11	Understand the issues related to addressing between networks.
33.12	Demonstrate proficiency with IPv6.
34.0	Define and explain the difference between routed and routing protocols. The student will be able to:
34.1	Describe routed (routable) protocols.

34.2	List the steps of data encapsulation in an internetwork as data is routed to one or more Layer 3 devices.
34.3	Describe connectionless and connection-oriented delivery.
34.4	Name the IP packet fields.
34.5	Describe process of routing.
34.6	Compare and contrast different types of routing protocols.
34.7	List and describe several metrics used by routing protocols.
34.8	List several uses for subnetting.
34.9	Determine the prefix/subnet mask for a given situation.
34.10	Use a prefix/subnet mask to determine the subnet ID.
35.0	Recognize, define, and explain functions of the transport layer. The student will be able to:
35.1	Describe the functions of the TCP/IP transport layer.
35.2	Describe flow control.
35.3	Describe the processes of establishing a connection between peer systems.
35.4	Describe windowing.
35.5	Describe acknowledgment.
35.6	Identify and describe transport layer protocols.
35.7	Describe TCP and UDP header formats.
35.8	Describe TCP and UDP port numbers and ports used for services and clients.
35.9	List the major protocols of the TCP/IP application layer.
35.10	Provide a brief description of the features and operation of well-known TCP/IP applications.
35.11	Describe TCP and UDP with its function.
35.12	Describe TCP synchronization and flow control.
35.13	Describe multiple conversations between hosts.
35.14	Understand the differences and the relationship between MAC addresses, IP addresses, and port numbers.

36.0	Explain, define, and identify the components of a WAN and router. The student will be able to:
36.1	Explain the difference between a WAN and LAN and the type of addresses each uses.
36.2	Describe the role of a router in a WAN.
36.3	Identify internal components of the router and describe their functions.
36.4	Describe the physical characteristics of the router.
36.5	Identify common ports on a router.
36.6	Properly connect FastEthernet, serial WAN, and console ports.
37.0	Describe and identify an operating system for a router. The student will be able to:
37.1	Describe the purpose of the router operating system.
37.2	Describe the basic operation of the router operating system.
37.3	Identify various router operating system features.
37.4	Identify the methods to establish a CLI session with the router.
37.5	Establish a terminal emulation session on a router.
37.6	Log into a router.
37.7	Use the help feature in the command line interface.
37.8	Troubleshoot command errors.
37.9	Name a router.
37.10	Set passwords.
37.11	Explore router configuration commands.
37.12	Configure router interface.
37.13	Upgrade router operating system.
37.14	Configure an interface description.
37.15	Configure banner message.
37.16	Understand the importance of version control.

37.17	Save changes to a router.
38.0	Explain how to establish connections between neighboring routers. The student will be able to:
38.1	Enable and disable protocols.
38.2	Determine which neighboring devices are connected to which local interfaces.
38.3	Establish, Verify, Disconnect, Suspend a Telnet connection.
38.4	Perform alternative connectivity tests.
38.5	Troubleshoot remote terminal connections.
39.0	Identify and explain the router boot sequence and file system. The student will be able to:
39.1	Identify the stages of the router boot sequence.
39.2	Determine how a router locates and loads its operating system.
39.3	Use the boot system command.
39.4	Identify the configuration register values.
39.5	Briefly describe the files used by the router operating system and their functions.
39.6	List the locations on the router of the different file types.
39.7	Save and restore configuration files using TFTP and copy-and paste.
39.8	Load a router operating system image using TFTP.
39.9	Verify the file system.
40.0	Identify and explain static and dynamic routing protocols. The student will be able to:
40.1	Explain the significance of static routing.
40.2	Configure static and default routes.
40.3	Verify and troubleshoot static and default routes.
40.4	Identify routing protocols.
40.5	Identify distance vector routing protocols.
40.6	Identify link-state routing protocols.

40.7	Describe the basic characteristics of common routing protocols.
40.8	Identify interior gateway protocols.
40.9	Identify exterior gateway protocols BGP.
40.10	Enable Routing Information Protocol (RIP) on a router.
41.0	Describe and configure distance vector protocols. The student will be able to:
41.1	Describe how routing loops can occur in distance vector routing.
41.2	Describe several methods used by distance vector routing protocols to ensure that routing information is accurate.
41.3	Configure RIP.
42.0	Perform tasks related to protocol troubleshooting. The student will be able to:
42.1	Describe ICMP.
42.2	Describe the ICMP message format and error message types.
42.3	Identify potential causes of specific ICMP error messages.
42.4	Describe ICMP control messages.
42.5	Identify a variety of ICMP control messages used in networks today.
42.6	Determine the causes for ICMP control messages.
43.0	Examine and test networks. The student will be able to:
43.1	Use the commands to gather detailed information about the routes installed on the router.
43.2	Configure a default route or default network.
43.3	Understand how a router uses both Layer 2 and Layer addressing to move data through the network.
44.0	Define, explain and describe access lists. The student will be able to:
44.1	Describe the differences between standard and extended ACLs.
44.2	Explain the rules for placement of ACLs.
44.3	Create and apply named ACLs.
44.4	Describe the function of firewalls.

44.5	Use ACLs to restrict virtual terminal access.
45.0	Solve problems using critical thinking skills, creativity and innovation. The student will be able to:
45.1	Employ critical thinking skills independently and in teams to solve problems and make decisions.
45.2	Employ critical thinking and interpersonal skills to resolve conflicts.
45.3	Identify and document workplace performance goals and monitor progress toward those goals.
45.4	Conduct technical research to gather information necessary for decision-making.
46.0	Use information technology tools. The student will be able to:
46.1	Use personal information management (PIM) applications to increase workplace efficiency.
46.2	Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.
46.3	Employ computer operations applications to access, create, manage, integrate, and store information.
46.4	Employ collaborative/groupware applications to facilitate group work.
47.0	Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. The student will be able to:
47.1	Describe the nature and types of business organizations.
47.2	Explain the effect of key organizational systems on performance and quality.
47.3	List and describe quality control systems and/or practices common to the workplace.
47.4	Explain the impact of the global economy on business organizations.
48.0	Describe the importance of professional ethics and legal responsibilities. The student will be able to:
48.1	Evaluate and justify decisions based on ethical reasoning.
48.2	Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies.
48.3	Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace.
48.4	Interpret and explain written organizational policies and procedures such as Sarbanes-Oxley, HIPPA, Gramm-Leach-Bliley.

Course Number: CTS0023

Occupational Completion Point: D

Network Support Administrator – 150 Hours – SOC Code 15-1142

49.0 Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance. The student will be able to:

49.1 Develop diplomatic methods to communicate with customers.

50.0 Participate in simulated work-based learning experiences. The student will be able to:

50.1 Participate in simulated work-based learning experiences in a network support services environment.

50.2 Discuss the use of technology in a network support services environment.

51.0 Provide network support and assistance by troubleshooting and diagnosing through direct contact remote access. The student will be able to:

51.1 Apply appropriate diagnostic techniques to solve network problems.

51.2 Perform local network support using various troubleshooting and diagnostic techniques.

51.3 Perform remote network support using various remote access methods.

52.0 Perform logical and physical network design activities. The student will be able to:

52.1 Describe the various LAN communication problems.

52.2 Describe the effects of LAN segmentation with bridges, routers, and switches.

52.3 Describe the operation, characteristics and benefits of VLANS.

52.4 Explain and identify LAN design goals, issues, and methodology.

52.5 Demonstrate the ability to analyze equipment necessary to meet specific design requirement.

52.6 Demonstrate the ability to create physical and logical network implementation documentation.

53.0 Demonstrate proficiency in selecting appropriate routing protocols and IP configuration for various network designs. The student will be able to:

53.1 Describe the two parts of network addressing, and then identify the parts in specific protocol address examples.

53.2 Demonstrate proficiency with IP addresses.

53.3 Configure IP addresses.

53.4	Verify IP addresses.
53.5	Identify the functions of the TCP/IP transport-layer protocols.
53.6	Identify the functions of the TCP/IP network-layer protocols.
53.7	Identify the functions performed by ICMP.
53.8	Explain the services of separate and integrated multi-protocol routing.
53.9	List problems that each routing type encounters when dealing with topology changes and describe techniques to reduce the number of these problems.
54.0	Demonstrate proficiency in using network traffic filtering to improve network performance and provide basic levels of security. The student will be able to:
54.1	Define and describe the purpose and operation of network traffic filtering.
54.2	Demonstrate proficiency in using configuration and interface commands to perform and monitor network traffic filtering.
55.0	Perform network management activities related to documentation, security, performance, administration, troubleshooting and coping with environmental factors. The student will be able to:
55.1	Perform documentation activities for networks, such as logs, journals, diagrams, labeling schemes, layouts, software listings, user policy, security policy.
55.2	Plan network security measures by establishing security policies and procedures, including user policies, authentication procedures, back-up and data recovery procedures, and redundancy techniques.
55.3	Demonstrate proficiency in using network monitoring software.
55.4	Explain the procedures necessary to monitor, create benchmarks, and plan for improvement of network performance.
55.5	Explain the administrative side of network management, including physical and logical boundaries, costs, error report documentation and the management of human resources.
56.0	Identify and describe various WAN functions, devices, and demonstrate understanding of the WAN design process. The student will be able to:
56.1	Describe the major features of WAN technology, including, devices, standards, encapsulation, link options, and packet and circuit switching.
56.2	Perform WAN design activities that require using the necessary steps in WAN design, the three-layered design model, and various other design models.
57.0	Describe the operation and implementation of virtual private networks. The student will be able to:
57.1	Describe the virtual private network operation.
57.2	Describe the virtual private network implementation.
57.3	Demonstrate an understanding of tunneling.

57.4	Describe secure VPN's.
58.0	Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance. The student will be able to:
58.1	Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.
58.2	Explain emergency procedures to follow in response to workplace accidents.
58.3	Create a disaster and/or emergency response plan.
59.0	Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives. The student will be able to:
59.1	Employ leadership skills to accomplish organizational goals and objectives.
59.2	Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.
59.3	Conduct and participate in meetings to accomplish work tasks.
59.4	Employ mentoring skills to inspire and teach others.
60.0	Explain the importance of employability skill and entrepreneurship skills. The student will be able to:
60.1	Identify and demonstrate positive work behaviors needed to be employable.
60.2	Develop personal career plan that includes goals, objectives, and strategies.
60.3	Examine licensing, certification, and industry credentialing requirements.
60.4	Maintain a career portfolio to document knowledge, skills, and experience.
60.5	Evaluate and compare employment opportunities that match career goals.
60.6	Identify and exhibit traits for retaining employment.
60.7	Identify opportunities and research requirements for career advancement.
60.8	Research the benefits of ongoing professional development.
60.9	Examine and describe entrepreneurship opportunities as a career planning option.
61.0	Demonstrate personal money-management concepts, procedures, and strategies. – The student will be able to:
61.1	Identify and describe the services and legal responsibilities of financial institutions.
61.2	Describe the effect of money management on personal and career goals.
61.3	Develop a personal budget and financial goals.

61.4	Complete financial instruments for making deposits and withdrawals.
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61.5	Maintain financial records.
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61.6	Read and reconcile financial statements.
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61.7	Research, compare and contrast investment opportunities.
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Course Number: CTS0024
Occupational Completion Point: E
Senior Network Administrator – 150 Hours – SOC Code 15-1143

62.0 Participate in simulated work-based learning experiences. The student will be able to:

62.1 Participate in simulated work-based learning experiences in a network support services environment.

62.2 Discuss the use of technology in a network support services environment.

63.0 Compare and contrast hierarchical network design models and scalable internetworks. The student will be able to:

63.1 Show proficiency in the use of the three-layer hierarchical design model.

63.2 Describe router functions in the core layer, distribution layer, and access layer.

63.3 Describe key characteristics of making the network reliable, available, responsive, efficient, adaptable, accessible, scalable and secure.

64.0 Discuss advanced IP addressing management. The student will be able to:

64.1 Describe and explain IPv4 addressing, Internet's address architecture, classes of IP addresses, and perform subnet masking.

64.2 Understand and explain Classless Interdomain Routing (CIDR), route aggregation, supernetting and address allocation.

64.3 Discuss and explain Variable-Length Subnet Masks along with classless and classful routing protocols.

64.4 Compare and contrast route summarization and route flapping.

64.5 Describe and discuss Network Address Translation (NAT), private addressing with NAT, private IP addresses (RFC 1918) and discontinuous subnets.

64.6 Describe the functions of private addressing and be able to explain the major features of and configure NAT, PAT, and DHCP.

64.7 Configure IOS DHCP server, Easy IP and IP helper addresses.

64.8 Discuss IP addressing crisis and solutions with IPv6 address formats.

65.0 Demonstrate proficiency in basic router configuration. The student will be able to:

65.1 Configure VLSM using routing fundamentals.

65.2 Configure static routing and dynamic routing using distance-vector routing protocols, link-state routing protocols, and hybrid routing.

65.3 Configure static default routes and default routing with EIGRP using default route caveats and floating static routes.

65.4 Describe and explain convergence issues and route calculation fundamentals.

65.5	Start routing process using various configurations, initiate routing updates and routing metrics.
66.0	Demonstrate proficiency in the use of OSPF. The student will be able to:
66.1	Discuss issues addressed by the use OSPF, list and define OSPF terminology, list OSPF states and OSPF network types, describe OSPF Hello protocol and Steps of OSPF operation.
66.2	Establish router adjacencies, elect a DR and a BDR, and discover routes.
66.3	Select appropriate routes and maintain routing information, configuring OSPF on routers within a single area.
66.4	Use optional configuration commands and configure OSPF over NBMA in a lab setting.
66.5	Describe Full-Mesh Frame Relay, Partial-Mesh Frame Relay, Point-to-Multipoint OSPF.
67.0	Understand and discuss multi-area OSPF operation and configuration. The student will be able to:
67.1	Configure OSPF, examining the DR/BDR election process.
67.2	Configure Point-to-Multipoint OSPF over frame relay, create multiple OSPF areas, use OSPF router types, and incorporate OSPF LSA and area types.
67.3	Configuring OSPF operation across multiple areas and flooding LSUs to multiple areas, updating the routing table.
67.4	Configure Multi-area OSPF, using and configuring OSPF multi-area components, and configuring OSPF route summarization.
67.5	Verify OSPF operation, show commands, clear and debug commands.
68.0	Demonstrate the use of stub and totally stubby areas. The student will be able to:
68.1	Demonstrate understanding of stub and totally stubby areas.
68.2	Set up an OSPF stub area configuration example.
68.3	Monitor multi-area OSPF, verifying multi-area OSPF operation.
68.4	Create a multi-area OSPF.
69.0	Demonstrate proficiency in route optimization. The student will be able to:
69.1	Show how to control routing updates, policy routing, and route redistribution.
69.2	Create a route optimization configuration in lab setting.
70.0	Demonstrate proficiency in the use of BGP. The student will be able to:
70.1	Define and explain autonomous systems and basic BGP operations.
70.2	Configure and monitor BGP operations and routing process.

70.3	Define and explain BGP attributes and the BGP decision process.
70.4	Create BGP configuration in lab setting.
70.5	Develop a scaling BGP and route reflectors.
70.6	Set up BGP route filtering and policy routing.
70.7	Explain the community attribute and peer groups.
70.8	Explain redundancy, symmetry, and load balancing.
70.9	Define and explain BGP redistribution.
70.10	Perform scaling BGP lab exercises and configure BGP in a lab setting.
71.0	Define and show proficiency in security. The student will be able to:
71.1	Show proficiency in securing router access using access lists.
71.2	Show proficiency in using dynamic access lists.
71.3	Show proficiency in session filtering.
71.4	Define and explain context-based access control.
71.5	Use an alternative to access lists.
71.6	Configure router security in a lab setting.
72.0	Using lab equipment, demonstrate the setup, configuration, and the connectivity of routers to create a small WAN. The student will be able to:
72.1	Demonstrate the use of remote access.
72.2	Select appropriate WAN technologies for different scenarios.
72.3	Select remote access solutions for different technologies.
72.4	Assemble and cable WAN components.
73.0	Configure and monitor DSL and DDR. The student will be able to:
73.1	Explain and discuss DSL architecture and DSL protocol layers.
73.2	Configure DSL, static routing and default routing, and DSL PRI.
73.3	Create optional configurations.

73.4	Monitor the DSL interface.
73.5	Create DSL configurations.
74.0	Demonstrate the use of scaling IP addresses with NAT. The student will be able to:
74.1	Define and explain NAT concepts and terminology.
74.2	Demonstrate proficiency in configuring, creating and verifying NAT configurations in lab setting.
75.0	Demonstrate proficiency using Authentication, Authorization and Accounting (AAA) to scale access control. The student will be able to:
75.1	List and define AAA concepts and terminology.
75.2	Demonstrate proficiency configuring AAA.
75.3	Perform lab exercises using access control configurations.
76.0	Understand and describe key characteristics of various switching technologies, LAN switching and the hierarchical model of network design, and the 3-tier model. The student will be able to:
76.1	Discuss the requirements of the evolving campus structure and the issues with traditional network designs.
76.2	Describe the fundamental campus elements and contributing variables to campus networks.
76.3	Compare and contrast the traditional 80/20 rule of network traffic and the new 20/80 rule of network traffic.
76.4	Discuss switching and the OSI model, layer 2, 3, and 4 switching, and multilayer switching.
76.5	Discuss the core layer, the distribution layer, and the access layer in relation to switching.
76.6	List and describe the advantages and disadvantages of the building-block approach, scaling the switch block, building the core block and layer 2 and 3 backbone scaling.
77.0	Understand and describe campus networks, design models, and switching technologies. The student will be able to:
77.1	List and explain key characteristics of various switching technologies.
77.2	Discuss LAN switching and the hierarchical model of network design.
77.3	Show proficiency using the 3-tier model to networking.
78.0	Show proficiency configuring a switch. The student will be able to:
78.1	Demonstrate the process for initial connectivity to a switch.
78.2	Show proficiency creating the basic configuration of a switch.
78.3	List and explain important switch operating system features.

79.0	Demonstrate proficiency configuring VLANs. The student will be able to:
79.1	Understand and explain VLANs.
79.2	Discuss VLAN basics and VLAN types.
79.3	Configure a VLAN in a lab setting.
79.4	Show use of VLAN identification techniques and VLAN trunking protocol.
79.5	Create VTP configuration and use VTP pruning.
80.0	Understand and explain spanning tree protocol (STP) and redundant links. The student will be able to:
80.1	Discuss Basic STP Operations and STP Processes.
80.2	Compare and contrast VLANs and STP.
80.3	Show how STP is used in the Campus Network.
80.4	Demonstrate the resolution of Redundant Links.
81.0	Demonstrate proficiency with multilayer switching. The student will be able to:
81.1	Define and explain MLS Processes.
81.2	Create basic MLS configurations.
81.3	Show proficiency using flow masks.
82.0	Demonstrate the use of hot standby routing protocol (HSRP). The student will be able to:
82.1	Define and explain HSRP operations.
82.2	Create HSRP configurations in a lab setting.
83.0	Understand and use IGMP and multicasting. The student will be able to:
83.1	Define and explain multicasting.
83.2	Understand and discuss IGMP.
83.3	Show proficiency routing multicast traffic.
83.4	Demonstrate proficiency using multicast routing protocols.
83.5	Configure IP multicast routing in a lab setting.

83.6	List and describe optional IP multicast routing tasks.
84.0	Demonstrate proficiency restricting network access. The student will be able to:
84.1	Show proficiency creating networking policies.
84.2	Discuss and explain basic network security techniques.
84.3	Demonstrate execution of policy configurations on a set of routers.
85.0	Demonstrate proficiency using network troubleshooting tools and basic network management diagnostic tools. The student will be able to:
85.1	Explain and discuss troubleshooting methodologies and general problem-solving concepts.
85.2	List and define general considerations in troubleshooting.
85.3	Define and explain each component of the general problem-solving model.
85.4	Demonstrate proficiency using common management and diagnostic tools.
85.5	Show proficiency using network management software.
85.6	Demonstrate proficiency using router diagnostic commands.
85.7	Familiarize logging and error message formats.
85.8	Demonstrate proficiency interacting with technical support.
86.0	List and define the commonly used protocols, routing techniques, and switching processes. The student will be able to:
86.1	List and define network services, layer 2 LAN protocols, and layer 2 WAN protocols.
86.2	Trace packets through a router.
86.3	Define and explain packet switching paths.
86.4	Identify performance issues affecting packet switching.
86.5	Define and explain low-level troubleshooting.
87.0	Demonstrate proficiency troubleshooting TCP/IP, LAN switch environment, VLANs and frame relay. The student will be able to:
87.1	List, define, and explain theory, concepts, and terminology of TCP/IP, LAN switch environment, spanning tree, VLANs and frame relay.
87.2	List, define, and explain common problems with TCP/IP and LAN switching.
87.3	List, define, and explain common scenarios with VLANs and frame relay.

87.4	Troubleshoot TCP/IP in a Windows environment; use LAN switch troubleshooting tools, explain general VLAN troubleshooting issues; list and explain the steps in frame relay troubleshooting and DSL problem isolation.
87.5	Use show commands to verify LAN switch configuration settings.
87.6	Use show and debug commands for TCP/IP, router VLANs and frame relay.
87.7	Use TCP/IP diagnostic tools.

Course Number: CTS0029
Occupational Completion Point: F
Wireless Network Administrator– 150 Hours – SOC Code 15-1143

88.0 Participate in simulated work-based learning experiences. The student will be able to:

88.1 Participate in simulated work-based learning experiences in a network support services environment.

88.2 Discuss the use of technology in a network support services environment.

88.3 Discuss the management/supervisory skills needed in a network support service environment.

89.0 Demonstrate proficiency in applying radio frequency (RF) technologies. The student will be able to:

89.1 Define and apply the basic concepts of RF behavior.

89.2 Understand the applications of basic RF antenna concepts.

89.3 Understand and apply the basic components of RF.

89.4 Identify some of the different uses for spread spectrum technologies.

89.5 Comprehend the differences between, and apply the different types of spread spectrum technologies.

89.6 Identify and apply the concepts which make up the functionality of spread spectrum technology.

89.7 Identify the laws set forth by the FCC that govern spread spectrum technology, including power outputs, frequencies, bandwidths, hop times, and dwell times.

90.0 Develop an awareness of wireless LAN technologies. The student will be able to:

90.1 Identify and apply the processes involved in authentication and association.

90.2 Recognize the concepts associated with wireless LAN service sets.

90.3 Understand the implications of the following power management features of wireless LANs.

90.4 Specify the modes of operation involved in the movement of data traffic across wireless LANs.

91.0 Perform implementation and management activities. The student will be able to:

91.1 Identify the technology roles for which wireless LAN technology is an appropriate technology application.

91.2 Identify the purpose of infrastructure devices and explain how to install, configure, and manage them.

91.3 Identify the purpose of wireless LAN client devices and explain how to install, configure, and manage them.

91.4	Identify the purpose of wireless LAN gateway devices and explain how to install, configure, and manage them.
91.5	Identify the basic attributes, purpose, and function of types of antennas.
91.6	Describe the proper locations and methods for installing antennas.
91.7	Explain the concepts of polarization, gain, beamwidth, and free-space path loss as they apply to implementing solutions that require antennas.
91.8	Identify the use of wireless LAN accessories and explain how to install, configure, and manage them.
91.9	Identify, understand, correct or compensate for wireless LAN implementation challenges.
91.10	Explain how antenna diversity compensates for multipath.
91.11	Identify and understand the importance and process of conducting a thorough site survey.
91.12	Identify and understand the importance of the necessary tasks involved in preparing to do an RF site survey.
91.13	Identify the necessary equipment involved in performing a site survey.
91.14	Understand the necessary procedures involved in performing a site survey.
91.15	Identify and understand site survey reporting procedures.
92.0	Develop an awareness of wireless security systems. The student will be able to:
92.1	Identify the strengths, weaknesses and appropriate uses of wireless LAN security techniques including the use of WVLAN's.
92.2	Describe types of wireless LAN security attacks, and explain how to identify and prevent them.
92.3	Given a wireless LAN scenario, identify the appropriate security solution from the following available wireless LAN security solutions.
92.4	Explain the uses of corporate security policies and how they are used to secure a wireless LAN.
92.5	Identify how and security precautions are used to secure a wireless LAN.
93.0	Demonstrate knowledge of wireless industry standards. The student will be able to:
93.1	Identify, apply and comprehend the differences between wireless LAN standards.
93.2	Understand the roles of organizations in providing direction and accountability within the wireless LAN industry.
93.3	Identify the differences between the ISM and UNII bands.
93.4	Identify and understand the differences between the power output rules for point-to-point and point-to-multipoint links.

Course Number: EEV0317
Occupational Completion Point: G
Data Communications Analyst – 150 Hours – SOC Code 15-1143

94.0 Participate in simulated work-based learning experiences. The student will be able to:

94.1 Participate in simulated work-based learning experiences in a network support services environment.

94.2 Discuss the use of technology in a network support services environment.

94.3 Discuss the management/supervisors skills needed in a network support services environment.

95.0 Demonstrate a knowledge of general security concepts. The student will be able to:

95.1 Describe access control.

95.2 Describe network authentication.

95.3 Understand the various types of network attacks (backdoors, DOS, spoofing).

95.4 Identify and modify non-essential services and protocols.

95.5 Identify malicious code (virus, worm, Trojan).

95.6 Configure system auditing, logging, and scanning as it relates to security procedures.

96.0 Develop an awareness of communication security concepts. The student will be able to:

96.1 Describe remote access protocols (VPN, RADIUS, L2TP).

96.2 Identify E-mail security concerns (hoaxes, spam).

96.3 Identify web (HTML) security concepts and designs (HTTP/S, IM).

96.4 Demonstrate an awareness of file transfer security concerns.

96.5 Describe and identify wireless networking security concerns and vulnerabilities.

97.0 Develop an awareness of network infrastructure security. The student will be able to:

97.1 Install and configure network firewalls.

97.2 Identify security concerns with various wiring media (copper, fiber).

97.3 Identify security concerns associated with removable media and storage devices.

97.4 Demonstrate an awareness of security topologies (security zones, Intranets, NAT).

97.5	Configure and use intrusion detection software.
97.6	Establish security baselines (updates, patches, hot fixes, Access Control lists).
97.7	Demonstrate the ability to configure a Virtual Private Network (VPN).
97.8	Describe the function of Network Address Translation (NAT).
98.0	Develop an awareness of cryptography and its relation to security. The student will be able to:
98.1	Demonstrate an understanding of security algorithms and encryption.
98.2	Use and apply Public Key Certificates.
98.3	Demonstrate an understanding of standards and protocols in commerce.
99.0	Incorporate organizational and operational security in an appropriate and effective manner. The student will be able to:
99.1	Describe how to establish a network security policy.
99.2	Explain the importance of physical security to protect network resources.
99.3	Identify and use disaster recovery procedures.
99.4	Describe the importance of business continuity and its relationship to network and corporate security.
99.5	Describe security policies and procedures that would be used in a business environment.
99.6	Explain the importance of privilege management (access, password management, sign-on).
99.7	Describe the concept of forensics as it applies to network security (obtaining evidence of security breaches).
99.8	Explain the importance of educating users and supervisors in regard to network security.
99.9	Create documentation that describes standards and guidelines for a network security system.

Additional Information

Laboratory Activities

Laboratory investigations that include scientific inquiry, research, measurement, problem solving, emerging technologies, tools and equipment, as well as, experimental, quality, and safety procedures are an integral part of this career and technical program/course. Laboratory investigations benefit all students by developing an understanding of the complexity and ambiguity of empirical work, as well as the skills required to manage, operate, calibrate and troubleshoot equipment/tools used to make observations. Students understand measurement error; and have the skills to aggregate, interpret, and present the resulting data. Equipment and supplies should be provided to enhance hands-on experiences for students.

Special Notes

MyCareerShines is an interactive resource to assist students in identifying their ideal career and to enhance preparation for employment. Teachers are encouraged to integrate this resource into the program curriculum to meet the employability goals for each student. Access MyCareerShines by visiting: www.mycareershines.org.

Career and Technical Student Organization (CTSO)

Phi Beta Lambda and Business Professionals of America (BPA) are the intercurricular student organizations providing leadership training and reinforcing specific career and technical skills. Career and Technical Student Organizations provide activities for students as an integral part of the instruction offered.

Cooperative Training – OJT

On-the-job training is appropriate but not required for this program. Whenever offered, the rules, guidelines, and requirements specified in the OJT framework apply.

Basic Skills

In a Career Certificate Program offered for 450 hours or more, in accordance with Rule 6A-10.040, F.A.C., the minimum basic skills grade levels required for postsecondary adult career and technical students to complete this program are: Mathematics 9, Language 9, and Reading 9. These grade level numbers correspond to a grade equivalent score obtained on a state designated basic skills examination.

Adult students with disabilities, as defined in Section 1004.02(7), Florida Statutes, may be exempted from meeting the Basic Skills requirements (Rule 6A-10.040). Students served in exceptional student education (except gifted) as defined in s. 1003.01(3)(a), F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91(3), F.S.

Students who possess a college degree at the Associate of Applied Science level or higher; who have completed or are exempt from the college entry-level examination; or who have passed a state, national, or industry licensure exam are exempt from meeting the Basic Skills requirement

(Rule 6A-10.040, F.A.C.) Exemptions from state, national or industry licensure are limited to the certifications listed on the Basic Skills and Licensure Exemption List which may be accessed from the CTE Program Resources page.

Accommodations

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Postsecondary students with disabilities must self-identify, present documentation, request accommodations if needed, and develop a plan with their counselor and/or instructors. Accommodations received in postsecondary education may differ from those received in secondary education. Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

Note: postsecondary curriculum and regulated secondary programs cannot be modified.

Additional Resources

For additional information regarding articulation agreements, Bright Futures Scholarships, Fine Arts/Practical Arts Credit and Equivalent Mathematics and Equally Rigorous Science Courses please refer to:

<http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml>