Florida Department of Education
Curriculum Framework

Program Title: Network Systems Administration
Program Type: Career Preparatory
Career Cluster: Information Technology

Career Certificate Program	
Program Number	B079300
CIP Number	0511090105
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 such as a Computer Support Assistant, Network Support Technician, Systems Administrator, Systems Engineer, Wireless Network Administrator, and Data Communications Analyst 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.

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	CTS0026	Network Support Technician		150 hours	15-1142
D	CTS0027	Systems Administrator		150 hours	15-1142
E	CTS0028	Systems Engineer		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:

01.0   Demonstrate knowledge, skill, and application of information systems to accomplish job objectives and enhance workplace performance.
02.0   Develop an awareness of microprocessors and digital computers.
03.0   Demonstrate an understanding of operating systems.
04.0   Use technology to enhance the effectiveness of communication skills utilizing word processing applications.
05.0   Use technology to enhance communication skills utilizing presentation applications.
06.0   Use technology to enhance the effectiveness of communication utilizing spreadsheet and database applications.
07.0   Use technology to enhance communication skills utilizing electronic mail.
08.0   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.
09.0   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, email, 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	Participate in work-based learning experiences.
26.0	Perform end user support and assistance by troubleshooting and diagnosing through telephone, email, remote access, or direct contact.
27.0	Perform installation and configuration activities.
28.0	Demonstrate proficiency using computer networks.
29.0	Demonstrate proficiency in configuring and troubleshooting hardware devices and drivers.
30.0	Demonstrate proficiency in managing, monitoring, and optimizing system performance, reliability and availability.
31.0	Demonstrate proficiency in managing, configuring and troubleshooting storage use.
32.0	Demonstrate proficiency in configuring and troubleshooting network connections.
33.0	Demonstrate proficiency in implementing, monitoring, and troubleshooting security.
34.0	Use oral and written communication skills in creating, expressing and interpreting information and ideas.
35.0	Solve problems using critical thinking skills, creativity and innovation.
36.0	Use information technology tools.
37.0	Describe the roles within teams, work units, departments, organizations, interorganizational systems, and the larger environment.
38.0	Describe the importance of professional ethics and legal responsibilities.
39.0	Incorporate appropriate leadership and supervision techniques, customer service strategies, and standards of personal ethics to accomplish job objectives and enhance workplace performance.
40.0	Participate in work-based learning experiences.
41.0	Administer accounts and resources on computers running server operating system software in a networked environment.
42.0	Modify user and computer accounts on computers running a server operating system in a networked environment.
43.0	Perform various administrative functions using groups.
44.0	Enable resource access with permissions, manage access to files and folders using permissions, and manage permission inheritance.
45.0	Implement printing in a networked environment utilizing a particular server operating system.
46.0	Utilize available permissions for managing access to global directory objects, how to move objects between organizational units in the same domain, and how to delegate control of an organizational unit.
47.0	Use group policy to configure folder redirection, browser connectivity, and the desktop.
48.0	Manage computer security in a networking environment.
49.0	Administer servers remotely.
50.0	Monitor server performance by using performance tools, configure and manage performance logs, configure and manage alerts, and manage system monitor views.
51.0	Collect performance data by monitoring primary server subsystems and identify system bottlenecks by using the performance monitoring software.
52.0	Maintaining device drivers.
53.0	Use software tools to manage and set up disks.
54.0	Use file encryption for security of data.
55.0	Plan for a computer disaster and use the features of a server operating system to prevent a disaster or recover when one occurs.
56.0	Manage and distribute critical software updates that resolve known security vulnerabilities and other stability issues.
57.0	Construct and assign IP addresses and isolate addressing issues associated with the IP routing process.
58.0	Configure an internet protocol (IP) address for client computers.
59.0	Configure name resolution mechanisms for clients on a network and describe the name resolution process.

60.0   Isolate common connectivity issues and describe how to use utilities and tools as part of this process.
61.0   Configure a routing solution for a network environment.
62.0   Allocate IP addressing in a network environment.
63.0   Manage the DHCP service to reflect changing client IP addressing needs and monitor DHCP server performance.
64.0   Assign computer names to the IP addresses of the source and destination hosts, and then use the computer name to contact the hosts.
65.0   Resolve host names by using domain name system.
66.0   Manage and monitor DNS servers to ensure that they are functioning properly and to optimize network performance.
67.0   Configure a server with the routing and remote access service, create appropriate remote access connections on a network access server, and configure users' access rights.
68.0   Manage and monitor network access and the network access services.
69.0   Perform installation of a network client operating system.
70.0   Install and configure hardware devices.
71.0   Configure and manage file systems.
72.0   Troubleshoot the boot process and other system issues.
73.0   Configure the desktop.
74.0   Configure IP addresses and name resolution.
75.0   Configure the client to work in a network environment.
76.0   Support remote users.
77.0   Configure a client OS for mobile computing.
78.0   Monitor resources and performance.
79.0   Demonstrate the importance of health, safety, and environmental management systems in organizations and their importance to organizational performance and regulatory compliance.
80.0   Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives.
81.0   Explain the importance of employability skill and entrepreneurship skills.
82.0   Apply communication skills (reading, writing, speaking, listening, and viewing) in a courteous, concise, and correct manner on personal and professional levels.
83.0   Participate in work-based learning experiences.
84.0   Plan a network infrastructure.
85.0   Plan and optimize a TCP/IP physical and logical network.
86.0   Plan and troubleshoot routing.
87.0   Plan a DHCP strategy.
88.0   Plan a DNS strategy.
89.0   Optimize and troubleshoot DNS.
90.0   Plan and troubleshoot IPSEC.
91.0   Plan a network access.
92.0   Troubleshoot network access.
93.0   Analyze global director infrastructure.
94.0   Implement a global directory structure and domain.
95.0   Implement an organizational unit structure.
96.0   Implement user, group, and computer accounts.
97.0   Implement group policy.

98.0 Deploy and manage software by using group policies.
99.0 Implement sites to manage global directory replication.
100.0 Implement placement of domain controllers.
101.0 Use a framework for designing security and create a security design team.
102.0 Recognize and predict common threats by using a threat model.
103.0 Apply a framework for planning risk management.
104.0 Design security for physical resources.
105.0 Design security for computers.
106.0 Design security for accounts.
107.0 Design security for authentication.
108.0 Design security for data.
109.0 Design security for data transmission.
110.0 Design security for network perimeter.
111.0 Design an audit policy and an incident response procedure.
112.0 Linux Foundation.
113.0 Linux Fundamentals.
114.0 Linux Installation.
115.0 Linux Operation.
116.0 Linux user Group and Permissions.
117.0 Linux Basic Security & System Monitoring.
118.0 Participate in work-based learning experiences.
119.0 Demonstrate proficiency in applying radio frequency (RF) technologies.
120.0 Develop an awareness of wireless LAN technologies.
121.0 Perform implementation and management activities.
122.0 Develop an awareness of wireless security systems.
123.0 Demonstrate knowledge of wireless industry standards.
124.0 Participate in work-based learning experiences.
125.0 Demonstrate knowledge of general security concepts.
126.0 Develop an awareness of communication security concepts.
127.0 Develop an awareness of network infrastructure security.
128.0 Develop an awareness of cryptography and its relation to security.
129.0 Incorporate organizational and operational security in an appropriate and effective manner.

Florida Department of Education
Student Performance Standards

Program Title: Network Systems Administration
Career Certificate Program Number: B079300

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:
	15.01 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:
	16.01 Identify and describe the functions of main processing boards.
	16.02 Identify and describe the functions of communication ports.
	16.03 Identify and describe the functions of peripheral devices.
	16.04 Identify and describe the components of portable systems.
	16.05 Troubleshoot, install and upgrade computers and peripherals.
	16.06 Perform system hardware setup.
	16.07 Demonstrate an understanding of input/output devices.
	16.08 Installation and configuration of applications software, hardware, and device drivers.
	16.09 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:
	17.01 Troubleshoot a personal computer system.
	17.02 Identify configuration problems.

	17.03	Identify software problems.
	17.04	Identify hardware malfunctions.
	17.05	Identify network malfunctions.
	17.06	Resolve computer error messages.
	17.07	Understand and troubleshoot memory and cache systems.
	17.08	Verify that drives are the appropriate type.
	17.09	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:
	18.01	Apply basic rules for hardware safety.
	18.02	Demonstrate proficiency in basic preventative hardware maintenance.
	18.03	Special disposal procedures that comply with environmental guidelines for batteries, CRTs, toner kits/cartridges, chemical solvents and cans, and MSDS.
	18.04	Apply ergonomic principles applicable to the configuration of computer workstations.
	18.05	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:
	19.01	Identify Random Access Memory (RAM) types.
	19.02	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:
	20.01	Identify types of printers.
	20.02	Identify care and service techniques and common problems with primary printer types.
	20.03	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:
	21.01	Define networking and describe the purpose of a network.
	21.02	Identify the purposes and interrelationships among the major components of networks.

	21.03	Describe the various types of network topologies.
	21.04	Identify and describe the purpose of standards, protocols, and the Open Systems Interconnection (OSI) reference model.
	21.05	Configure network and verify network connectivity.
	21.06	Discuss the responsibilities of the network.
	21.07	Develop user logon procedures.
	21.08	Utilize network management infrastructures to perform administrative tasks.
	21.09	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:	
	22.01	Apply call center vocabulary.
	22.02	Listen and input information simultaneously.
	22.03	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:	
	23.01	Identify parts of GUI windows.
	23.02	Demonstrate proficiency in using menu systems.
	23.03	Demonstrate proficiency in using pointing and selection devices.
	23.04	Identify keyboard shortcuts and special function keys.

23.05	Demonstrate proficiency in manipulating windows.
23.06	Utilize help systems and hypertext links.
23.07	Create, organize, and maintain file system directories.
23.08	Organize desktop objects.
23.09	Run multiple applications.

Course Number: CTS0026
Occupational Completion Point: C
Network Support Technician – 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:
	24.01 Develop diplomatic methods to communicate with customers.
25.0	Participate in work-based learning experiences. The student will be able to:
	25.01 Participate in work-based learning experiences in a network support services environment.
	25.02 Discuss the use of technology in a network environment.
26.0	Perform end user support and assistance by troubleshooting and diagnosing through telephone, email, remote access, or direct contact. The student will be able to:
	26.01 Apply first response assistance for minor repair work.
27.0	Perform installation and configuration activities. The student will be able to:
	27.01 Configure the operating system environment.
	27.02 Connect client workstation running similar operating system to the network.
	27.03 Configure Internet access for a network.
	27.04 Configure a web server.
	27.05 Use remote server to deploy operating system.
	27.06 Troubleshoot failed installations.
	27.07 Install and configure network services for interoperability.
	27.08 Monitor, configure troubleshoot and control access to printers.
	27.09 Monitor, configure troubleshoot and control access to files, folders, and shared folders.
	27.10 Monitor, configure troubleshoot and control access to websites.
28.0	Demonstrate proficiency using computer networks. The student will be able to:
	28.01 Identify and describe the purpose of standards, protocols, and the Open Systems Interconnection (OSI) reference model.

29.0	Demonstrate proficiency in configuring and troubleshooting hardware devices and drivers. The student will be able to:
	29.01 Configure hardware devices.
	29.02 Configure driver signing options.
	29.03 Update device drivers.
	29.04 Troubleshoot problems with hardware.
30.0	Demonstrate proficiency in managing, monitoring, and optimizing system performance, reliability and availability. The student will be able to:
	30.01 Monitor and optimize usage of system resources.
	30.02 Manage processes.
	30.03 Optimize disk performance.
	30.04 Manage and optimize availability of system data and user data.
	30.05 Recover systems and user data.
31.0	Demonstrate proficiency in managing, configuring and troubleshooting storage use. The student will be able to:
	31.01 Configure and manage user profiles.
	31.02 Monitor, configure and troubleshoot disks and volumes.
	31.03 Configure data compression.
	31.04 Monitor and configure disk quotas.
	31.05 Recover from disk failures.
32.0	Demonstrate proficiency in configuring and troubleshooting network connections. The student will be able to:
	32.01 Install, configure and troubleshoot shared access.
	32.02 Install, configure and troubleshoot a virtual private network.
	32.03 Install, configure and troubleshoot network protocols.
	32.04 Install and configure network services.

	32.05	Configure, monitor and troubleshoot remote access.
	32.06	Install, configure, monitor, and troubleshoot Terminal Services.
	32.07	Configure the properties of a connection.
	32.08	Install, configure, and troubleshoot network adapters and drivers.
33.0	Demonstrate proficiency in implementing, monitoring, and troubleshooting security. The student will be able to:	
	33.01	Encrypt data on a hard disk by using Encrypting File System.
	33.02	Implement, configure, manage and troubleshoot policies in an operating system environment.
	33.03	Implement, configure, manage and troubleshoot auditing.
	33.04	Implement, configure, manage and troubleshoot local accounts.
	33.05	Implement, configure, manage and troubleshoot account policy.
	33.06	Implement, configure, manage and troubleshoot security by using the Security Configuration Tool Set.
34.0	Use oral and written communication skills in creating, expressing and interpreting information and ideas. The student will be able to:	
	34.01	Select and employ appropriate communication concepts and strategies to enhance oral and written communication in the workplace.
	34.02	Locate, organize and reference written information from various sources.
	34.03	Design, develop and deliver formal and informal presentations using appropriate media to engage and inform diverse audiences.
	34.04	Interpret verbal and nonverbal cues/behaviors that enhance communication.
	34.05	Apply active listening skills to obtain and clarify information.
	34.06	Develop and interpret tables and charts to support written and oral communications.
	34.07	Exhibit public relations skills that aid in achieving customer satisfaction.
35.0	Solve problems using critical thinking skills, creativity and innovation. The student will be able to:	
	35.01	Employ critical thinking skills independently and in teams to solve problems and make decisions.
	35.02	Employ critical thinking and interpersonal skills to resolve conflicts.

	35.03	Identify and document workplace performance goals and monitor progress toward those goals.
	35.04	Conduct technical research to gather information necessary for decision-making.
36.0	**Use information technology tools. The student will be able to:**	
	36.01	Use personal information management (PIM) applications to increase workplace efficiency.
	36.02	Employ technological tools to expedite workflow including word processing, databases, reports, spreadsheets, multimedia presentations, electronic calendar, contacts, email, and internet applications.
	36.03	Employ computer operations applications to access, create, manage, integrate, and store information.
	36.04	Employ collaborative/groupware applications to facilitate group work.
37.0	**Describe the roles within teams, work units, departments, organizations, inter-organizational systems, and the larger environment. The student will be able to:**	
	37.01	Describe the nature and types of business organizations.
	37.02	Explain the effect of key organizational systems on performance and quality.
	37.03	List and describe quality control systems and/or practices common to the workplace.
	37.04	Explain the impact of the global economy on business organizations.
38.0	**Describe the importance of professional ethics and legal responsibilities. The student will be able to:**	
	38.01	Evaluate and justify decisions based on ethical reasoning.
	38.02	Evaluate alternative responses to workplace situations based on personal, professional, ethical, legal responsibilities, and employer policies.
	38.03	Identify and explain personal and long-term consequences of unethical or illegal behaviors in the workplace.
	38.04	Interpret and explain written organizational policies and procedures.

Course Number: CTS0027
Occupational Completion Point: D
Systems Administrator – 150 Hours – SOC Code 15-1142

39.0	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:
	39.01 Develop diplomatic methods to communicate with customers, clients, and end-users of information technology services.
40.0	Participate in work-based learning experiences. The student will be able to:
	40.01 Participate in work-based learning experiences in a network support services environment.
	40.02 Discuss the use of technology in a network support services environment.
	40.03 Discuss the management/supervisors skills needed in a network support services environment.
41.0	Administer accounts and resources on computers running server operating system software in a networked environment. The student will be able to:
	41.01 Describe features of server operating system.
	41.02 Log on to the server operating system.
	41.03 Install and configure administrative tools.
	41.04 Create user accounts.
	41.05 Create computer accounts.
	41.06 Create an organizational unit.
42.0	Modify user and computer accounts on computers running a server operating system in a networked environment. The student will be able to:
	42.01 Modify user and computer account properties.
	42.02 Enable and unlock user and computer accounts.
	42.03 Create a user account template.
	42.04 Locate user and computer accounts in a global directory structure.
	42.05 Save queries.
	42.06 Reset user and computer accounts.
	42.07 Move domain objects.

43.0	Perform various administrative functions using groups. The student will be able to:
	43.01 Create groups.
	43.02 Manage group membership.
	43.03 Apply strategies for using groups.
	43.04 Modify groups.
	43.05 Manage default groups.
44.0	Enable resource access with permissions, manage access to files and folders using permissions, and manage permission inheritance. The student will be able to:
	44.01 Manage access to resources.
	44.02 Manage access to shared folders.
	44.03 Manage access to files and folders by using file system permissions.
	44.04 Determine effective permissions.
	44.05 Manage access to shared files by using offline caching.
45.0	Implement printing in a networked environment utilizing a particular server operating system. The student will be able to:
	45.01 Install and share printers.
	45.02 Manage access to printers by using shared printer permissions.
	45.03 Manage printer drivers.
	45.04 Implement printer locations.
	45.05 Change the location of the print spooler.
	45.06 Set printing priorities.
	45.07 Schedule printer availability.
	45.08 Configure a printing tool.
46.0	Utilize available permissions for managing access to global directory objects, how to move objects between organizational units in the same domain, and how to delegate control of an organizational unit. The student will be able to:
	46.01 Identify the role of organizational units.

	46.02	Modify permissions for global directory objects.
	46.03	Delegate control of organizational units.
47.0	Use group policy to configure folder redirection, browser connectivity, and the desktop. The student will be able to:	
	47.01	Configure group policy settings.
	47.02	Assign scripts with group policy.
	47.03	Configure folder redirection.
48.0	Manage computer security in a security in a networking environment. The student will be able to:	
	48.01	Describe the security features a server operating system.
	48.02	Use security templates to secure computers.
	48.03	Test computer security policy.
	48.04	Configure auditing.
	48.05	Manage security logs.
49.0	Administer servers remotely. The student will be able to:	
	49.01	Explain the tasks, tools, and rights that are required to administer a server.
	49.02	Configure remote access for administration and client preferences.
	49.03	Manage remote desktop connections.
50.0	Monitor server performance by using performance tools, configure and manage performance logs, configure and manage alerts, and manage system monitor views. The student will be able to:	
	50.01	Establish a performance baseline.
	50.02	Perform real-time and logged monitoring.
	50.03	Configure and manage counter logs.
	50.04	Configure alerts.
51.0	Collect performance data by monitoring primary server subsystems and identify system bottlenecks by using the performance monitoring software. The student will be able to:	
	51.01	Explain how the four primary server subsystems affect server performance.

	51.02	Monitor server memory.
	51.03	Monitor processor usage.
	51.04	Monitor disks.
	51.05	Monitor network usage.
	51.06	Identify the guidelines for using counters and thresholds.
	51.07	Describe the best practices for monitoring server performance.
52.0	Maintain device drivers. The student will be able to:	
	52.01	Configure device driver signing.
	52.02	Restore the previous version of a device driver.
53.0	Use software tools to manage and set up disks. The student will be able to:	
	53.01	Initialize and partition a disk.
	53.02	View and update disk properties.
	53.03	Manage mounted drives.
	53.04	Create volumes on a disk.
	53.05	Convert a disk from basic to dynamic and from dynamic to basic.
	53.06	Import disks.
54.0	Use file encryption for security of data. The student will be able to:	
	54.01	Manage disk based file compression.
	54.02	Configure file encryption.
	54.03	Implement disk quotas.
55.0	Plan for a computer disaster and use the features of a server operating system to prevent a disaster or recover when one occurs. The student will be able to:	
	55.01	Prepare for disaster recovery.
	55.02	Back up data.

	55.03	Schedule backup jobs.
	55.04	Restore data.
	55.05	Configure a shadow copy.
	55.06	Recover from server failure.
	55.07	Select a disaster recovery method.
56.0	Manage and distribute critical software updates that resolve known security vulnerabilities and other stability issues. The student will be able to:	
	56.01	Install and configure client computers to use receive software updates.
	56.02	Install and configure servers to use perform software updates.
	56.03	Manage the Software Update Services infrastructure.
57.0	Construct and assign IP addresses and isolate addressing issues associated with the IP routing process. The student will be able to:	
	57.01	Convert IP Addresses from decimal to binary.
	57.02	Calculate a subnet mask.
	57.03	Create subnets using VLSM and CIDR.
	57.04	Isolate addressing issues associated with the IP routing process.
58.0	Configure an internet protocol (IP) address for client computers. The student will be able to:	
	58.01	Configure a client to use a static IP address.
	58.02	Configure a client to obtain an IP address automatically by using DHCP.
	58.03	Configure a client to obtain an IP address automatically by using Alternate Configuration.
59.0	Configure name resolution mechanisms for clients on a network and describe the name resolution process. The student will be able to:	
	59.01	Use ARP to identify client media access control (MAC) addresses.
	59.02	Describe the function of Network Basic Input/Output System (NetBIOS).
	59.03	Configure a client to use a static IP address.
	59.04	Configure a client to use name resolution servers.

60.0	Isolate common connectivity issues and describe how to use utilities and tools as part of this process. The student will be able to:
	60.01 Isolate common connectivity issues.
	60.02 Use a flow chart to isolate a problem.
	60.03 Use utilities and tools to isolate a problem.
61.0	Configure a routing solution for a network environment. The student will be able to:
	61.01 Describe the role of routing in the network infrastructure.
	61.02 Enable and configure the Routing and Remote Access service.
	61.03 Configure packet filters.
62.0	Allocate IP addressing in a network environment. The student will be able to:
	62.01 Describe the role of DHCP in the network infrastructure.
	62.02 Add and authorize a DHCP Server service.
	62.03 Configure a DHCP scope.
	62.04 Configure DHCP options.
	62.05 Configure a DHCP reservation.
	62.06 Configure a DHCP relay agent.
63.0	Manage the DHCP service to reflect changing client IP addressing needs and monitor DHCP server performance. The student will be able to:
	63.01 Manage a DHCP database.
	63.02 Monitor DHCP.
	63.03 Apply security guidelines for DHCP.
64.0	Assign computer names to the IP addresses of the source and destination hosts, and then use the computer name to contact the hosts. The student will be able to:
	64.01 Describe the name resolution process.
	64.02 View names on a client.
	64.03 Configure host name resolution.

65.0	Resolve host names by using domain name system. The student will be able to:
	65.01 Describe the role of DNS in the network infrastructure.
	65.02 Install the DNS Server service.
	65.03 Configure the properties for the DNS Server service.
	65.04 Configure the DNS zones.
	65.05 Configure DNS zone transfers.
	65.06 Configure dynamic updates.
	65.07 Configure a DNS client.
	65.08 Delegate authority for zones.
66.0	Manage and monitor DNS servers to ensure that they are functioning properly and to optimize network performance. The student will be able to:
	66.01 Configure the Time-to-Live (TTL) value.
	66.02 Configure aging and scavenging.
	66.03 Integrate DNS with WINS.
	66.04 Test the DNS server configuration.
	66.05 Monitor DNS server performance.
67.0	Configure a server with the routing and remote access service, create appropriate remote access connections on a network access server, and configure users' access rights. The student will be able to:
	67.01 Describe a network access infrastructure.
	67.02 Configure a virtual private network (VPN) connection.
	67.03 Configure a dial-up connection.
	67.04 Configure a wireless connection.
	67.05 Control remote user access to a network.
	67.06 Centralize authentication and policy management for network access by using Internet Authentication Service (IAS).
68.0	Manage and monitor network access and the network access services. The student will be able to:

	68.01	Configure logging on the network access server.
	68.02	Collect and monitor network access data.
69.0	Perform installation of a network client operating system. The student will be able to:	
	69.01	Plan a client operating system installation.
	69.02	Install a client operating system.
	69.03	Upgrade a client operating system from an earlier version.
	69.04	Automate the installation process for a client operating system.
70.0	Install and configure hardware devices. The student will be able to:	
	70.01	Configure hardware devices and drivers on a computer running a client OS.
	70.02	Add and remove devices by using built in utilities and wizards.
	70.03	Restore device drivers.
71.0	Configure and manage file systems. The student will be able to:	
	71.01	Work with file systems.
	71.02	Manage data compression.
	71.03	Secure data by using EFS.
	71.04	Configure disk compression.
	71.05	Secure files by using EFS.
72.0	Troubleshoot the boot process and other system issues. The student will be able to:	
	72.01	Examine the boot process.
	72.02	Control system settings during the boot process.
	72.03	Change startup behavior.
	72.04	Use advanced boot options to troubleshoot startup problems.
	72.05	Restore a computer to a previous state.

	72.06	Troubleshoot the boot process and other system issues.
73.0	**Configure the desktop. The student will be able to:**	
	73.01	Configure user desktop settings.
	73.02	Customize the desktop environment.
	73.03	Configure system settings.
	73.04	Describe how user profiles and group policy affect desktop customization.
74.0	**Configure IP addresses and name resolution. The student will be able to:**	
	74.01	Configure IP addresses.
	74.02	Troubleshoot IP addresses.
	74.03	Determine TCP/IP name resolution methods.
	74.04	Configure a DNS and WINS client.
	74.05	Connect to a remote host.
	74.06	Configure IP addresses.
	74.07	Configure the DNS client.
75.0	**Configure the client to work in a network environment. The student will be able to:**	
	75.01	Examine workgroups and user accounts.
	75.02	Create and authenticate local user accounts.
	75.03	Configure local security.
	75.04	Configure logon options.
	75.05	Configure networking.
	75.06	Join a domain.
	75.07	Operate in a domain.
76.0	**Support remote users. The student will be able to:**	

	76.01	Establish remote access connections.
	76.02	Connect to Virtual Private Networks.
	76.03	Configure inbound connections.
	76.04	Configure authentication protocols and encryption.
	76.05	Using remote desktop.
	76.06	Store user names and passwords to facilitate remote connections.
	76.07	Configure a VPN connection.
	76.08	Configure and using remote desktop.
	76.09	Store user names and passwords.
77.0	Configure a client OS for mobile computing. The student will be able to:	
	77.01	Configure hardware for mobile computing.
	77.02	Configure power management options for mobile computing.
	77.03	Make files, folders, and webpages available for offline use.
78.0	Monitor resources and performance. The student will be able to:	
	78.01	Determine system information.
	78.02	Use task manager to monitor system performance.
	78.03	Use performance and maintenance tools to improve performance.
	78.04	Monitor event logs.
	78.05	Configure program compatibility.
79.0	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:	
	79.01	Describe personal and jobsite safety rules and regulations that maintain safe and healthy work environments.
	79.02	Explain emergency procedures to follow in response to workplace accidents.
	79.03	Create a disaster and/or emergency response plan.

80.0	**Demonstrate leadership and teamwork skills needed to accomplish team goals and objectives. The student will be able to:**	
	80.01	Employ leadership skills to accomplish organizational goals and objectives.
	80.02	Establish and maintain effective working relationships with others in order to accomplish objectives and tasks.
	80.03	Conduct and participate in meetings to accomplish work tasks.
	80.04	Employ mentoring skills to inspire and teach others.
81.0	**Explain the importance of employability skill and entrepreneurship skills. The student will be able to:**	
	81.01	Identify and demonstrate positive work behaviors needed to be employable.
	81.02	Develop personal career plan that includes goals, objectives, and strategies.
	81.03	Examine licensing, certification, and industry credentialing requirements.
	81.04	Maintain a career portfolio to document knowledge, skills, and experience.
	81.05	Evaluate and compare employment opportunities that match career goals.
	81.06	Identify and exhibit traits for retaining employment.
	81.07	Identify opportunities and research requirements for career advancement.
	81.08	Research the benefits of ongoing professional development.
	81.09	Examine and describe entrepreneurship opportunities as a career planning option.
	81.10	Research, compare and contrast investment opportunities.

Course Number: CTS0028
Occupational Completion Point: E
Systems Engineer – 150 Hours – SOC Code 15-1143

82.0	Apply communication skills (reading, writing, speaking, listening, viewing) in a courteous, concise, and correct manner on personal and professional levels. The student will be able to:
	82.01 Communicate technical information in a concise, understandable manner to a non-technical audience both verbally and in writing.
83.0	Participate in work-based learning experiences. The student will be able to:
	83.01 Participate in work-based learning experiences in a network support services environment.
	83.02 Discuss the use of technology in a network support services environment.
	83.03 Compare and contrast the software applications used in a network support services environment.
84.0	Plan a network infrastructure. The student will be able to:
	84.01 Explain how to plan a network.
	84.02 Explain how to prepare development and test environments.
	84.03 Explain the concepts of managing and maintaining a network environment by using specific tools.
	84.04 Explain the technologies and services implemented in a network.
85.0	Plan and optimize a TCP/IP physical and logical network. The student will be able to:
	85.01 Discuss TCP/IP.
	85.02 Plan a TCP/IP addressing scheme.
	85.03 Optimize network performance.
86.0	Plan and troubleshoot routing. The student will be able to:
	86.01 Describe how routing works.
	86.02 Create a secure routing plan.
	86.03 Identify TCP/IP routing trouble shooting tools.
	86.04 Troubleshoot TCP/IP routing.
87.0	Plan a DHCP strategy. The student will be able to:

	87.01	Demonstrate how DHCP operates in an enterprise environment.
	87.02	Plan a DHCP strategy.
	87.03	Secure a DHCP strategy.
88.0	Plan a DNS strategy. The student will be able to:	
	88.01	Plan a namespace strategy.
	88.02	Plan zones.
	88.03	Plan zone replication.
	88.04	Plan a DNS server implementation.
89.0	Optimize and troubleshoot DNS. The student will be able to:	
	89.01	Optimize a DNS server.
	89.02	Optimize the DNS server-to-server communications.
	89.03	Optimize DNS client support traffic.
	89.04	Troubleshoot host name resolution.
90.0	Plan and troubleshoot IPSEC. The student will be able to:	
	90.01	Discuss IPSec.
	90.02	Understand IPSec default policies, rules, and settings.
	90.03	Plan IPSec deployment.
	90.04	Troubleshoot IPSec.
91.0	Plan a network access. The student will be able to:	
	91.01	Select appropriate connection methods for a network access strategy.
	91.02	Select a remote access policy strategy.
	91.03	Select a network access authentication method.
	91.04	Plan a network access strategy.

92.0	**Troubleshoot network access. The student will be able to:**
	92.01 Identify network access troubleshooting resources.
	92.02 Troubleshoot network authentication.
	92.03 Troubleshoot LAN authentication.
	92.04 Troubleshoot remote access.
93.0	**Analyze global director infrastructure. The student will be able to:**
	93.01 Describe the architecture of global directory.
	93.02 Describe the working of global directory.
	93.03 Use administrative tools to examine the components of global directory.
	93.04 Describe the global directory design, planning, and implementation processes.
94.0	**Implement a global directory structure and domain structure. The student will be able to:**
	94.01 Create a forest and domain structure.
	94.02 Configure DNS in a global directory environment.
	94.03 Raise the functional level of a forest and a domain.
	94.04 Create trust relationships between domains.
	94.05 Secure trusts by using SID filtering.
95.0	**Implement an organizational unit structure. The student will be able to:**
	95.01 Create an organizational unit.
	95.02 Delegate control for an organizational unit.
	95.03 Plan an organization unit strategy.
96.0	**Implement user, group, and computer accounts. The student will be able to:**
	96.01 Describe the types of global directory accounts and groups.
	96.02 Create multiple user and computer accounts.

	96.03	Implement UPN suffixes.
	96.04	Move objects within a domain and across domains in a global structure.
	96.05	Plan a strategy for user computer and group accounts.
	96.06	Plan a global directory audit strategy.
97.0	Implement group policy. The student will be able to:	
	97.01	Create and configure group policy objects.
	97.02	Manage group policy objects.
	97.03	Verify and troubleshoot group policies.
	97.04	Delegate administrative control of group policies.
	97.05	Plan a group policies strategy for the enterprise.
98.0	Deploy and manage software by using group policies. The student will be able to:	
	98.01	Explain the basic concepts of software deployment by using group policies.
	98.02	Deploy software by using group policies.
	98.03	Configure software deployment by using group policies.
	98.04	Maintain deployed software by using group policies.
	98.05	Troubleshoot some common problems with software deployment.
	98.06	Plan a software deployment strategy.
99.0	Implement sites to manage global directory replication. The student will be able to:	
	99.01	Explain the components and the process of replication.
	99.02	Create and configure sites.
	99.03	Manage a global directory site topology.
	99.04	Monitor and troubleshoot global directory replication failures.
	99.05	Plan a site strategy.

100.0	Implement placement of domain controllers. The student will be able to:
	100.01 Implement a global catalog in a global directory.
	100.02 Determine the placement of domain controllers in a global directory.
	100.03 Create a plan for placing domain controllers in a global directory.
101.0	Use a framework for designing security and create a security design team. The student will be able to:
	101.01 Describe common elements of security policies and procedures.
	101.02 Create a security design framework.
	101.03 Create a security design team.
102.0	Recognize and predict common threats by using a threat model. The student will be able to:
	102.01 Explain common network vulnerabilities and how attackers can exploit them.
	102.02 Predict threats to security by using the STRIDE (Spoofing, Tampering, Repudiation, Information disclosure, Denial of service, Elevation of privilege) threat model.
103.0	Apply a framework for planning risk management. The student will be able to:
	103.01 Explain the purpose and operation of risk management.
	103.02 Draft the elements of a risk management plan.
104.0	Design security for physical resources. The student will be able to:
	104.01 Determine threats and analyze risks to physical resources.
	104.02 Design security for physical resources.
105.0	Design security for computers. The student will be able to:
	105.01 Determine threats and analyze risks to computers.
	105.02 Design security for computers.
106.0	Design security for accounts. The student will be able to:
	106.01 Determine threats and analyze risks to accounts.
	106.02 Design security for accounts.

107.0 Design security for authentication. The student will be able to:	
107.01 Determine threats and analyze risks to authentication.	
107.02 Design security for authentication.	
108.0 Design security for data. The student will be able to:	
108.01 Determine threats and analyze risks to data.	
108.02 Design security for data.	
109.0 Design security for data transmission. The student will be able to:	
109.01 Determine threats and analyze risks to data transmission.	
109.02 Design security for data transmission.	
110.0 Design security for network perimeters. The student will be able to:	
110.01 Determine threats and analyze risks to network perimeters.	
110.02 Design security for network perimeters.	
111.0 Design an audit policy and an incident response procedure. The student will be able to:	
111.01 Explain the importance of auditing and incident response.	
111.02 Design an auditing policy.	
111.03 Design an incident response procedure.	
112.0 Linux Foundation. The student will be able to:	
112.01 Explain the creation history of Linux.	
112.02 Explain Free and Open Source Software (FOSS).	
112.03 Explain the concept of a GNU General Public License (GPL).	
112.04 Explain the concept of a Linux distribution and name some well-known distributions.	
112.05 Site common uses of Linux and it's roles in global networks.	
113.0 Linux Fundamentals. The student will be able to:	

113.01 Access and utilize the command line interface shell.	
113.02 Explain the purpose of and demonstrate the use of the super user and super user do (sudo) command.	
113.03 Know where to get help and how to use the manual (man) pages.	
113.04 Use non-graphical text editors such as vi and nano.	
113.05 Use and create command aliases.	
113.06 Adjust environmental variables and shell configuration files.	
113.07 Demonstrate redirection, piping, standard input, standard output, & standard error.	
113.08 Work with Directories, links, and files.	
113.09 Describe the most common Filesystem Hierarchy Standard (FHS).	
113.10 Compress and decompress files using standard Linux utilities.	
114.0 Linux Installation. The student will be able to:	
114.01 Plan and perform a Linux installation including harddrive partitioning, Logical Volumes (LV), and basic Logical Volume Management (LVM) operation.	
114.02 Install various distributions of Linux in server and client modes.	
114.03 Explain the boot loader and describe the most common boot loader, GRUB2.	
115.0 Linux System Operation. The student will be able to:	
115.01 Start, display, and kill running processes.	
115.02 Explain the purpose of the Process ID (PID).	
115.03 Explain the relationship of parent, child, and zombie processes.	
115.04 Explain the role of systemd.	
115.05 Update and upgrade running Linux systems.	
115.06 Describe the use of shared libraries.	
115.07 Mount volumes.	
116.0 Linux Users Groups and Permissions. The student will be able to:	

116.01 Display existing groups and users.	
116.02 Create users.	
116.03 Explain the use of the shadow password file.	
116.04 Create groups.	
116.05 Assign users to groups.	
116.06 Explain how Linux uses file and folder ownership and group permissions.	
116.07 Change ownership and group ownership of files and folders.	
116.08 Explain the attributes read, write, execute (rwx).	
116.09 Demonstrate the ability to change attributes using the single, multiple, and binary methods.	
116.10 Describe the use of special permissions.	
117.0 Linux Basic Security & System Monitoring. The student will be able to:	
117.01 Configure network interfaces for IPv4 and IPv6.	
117.02 Display iptables and create a new firewall rule.	
117.03 Demonstrate the ability to read and manipulate system & security log files using head, tail, cat, less, and more.	
117.04 Demonstrate the ability to backup system & security logs.	
117.05 Create basic scripts to automate tasks.	
117.06 Block logins, disable, and re-enable accounts.	
117.07 Remove un-needed services and disable unused ports.	

Course Number: CTS0029 Occupational Completion Point: F Wireless Network Administrator – 150 Hours – SOC Code 15-1143
118.0   Participate in simulated work-based learning experiences. The student will be able to:
118.01 Participate in simulated work-based learning experiences in a network support services environment.
118.02 Discuss the use of technology in a network support services environment.
118.03 Discuss the management/supervisory skills needed in a network support service environment.
119.0   Demonstrate proficiency in applying radio frequency (RF) technologies. The student will be able to:
119.01 Define and apply the basic concepts of RF behavior.
119.02 Understand the applications of basic RF antenna concepts.
119.03 Understand and apply the basic components of RF.
119.04 Identify some of the different uses for spread spectrum technologies.
119.05 Comprehend the differences between, and apply the different types of spread spectrum technologies.
119.06 Identify and apply the concepts which make up the functionality of spread spectrum technology.
119.07 Identify the laws set forth by the FCC that govern spread spectrum technology, including power outputs, frequencies, bandwidths, hop times, and dwell times.
120.0   Develop an awareness of wireless LAN technologies. The student will be able to:
120.01 Identify and apply the processes involved in authentication and association.
120.02 Recognize the concepts associated with wireless LAN service sets.
120.03 Understand the implications of the following power management features of wireless LANs.
120.04 Specify the modes of operation involved in the movement of data traffic across wireless LANs.
121.0   Perform implementation and management activities. The student will be able to:
121.01 Identify the technology roles for which wireless LAN technology is an appropriate technology application.
121.02 Identify the purpose of infrastructure devices and explain how to install, configure, and manage them.
121.03 Identify the purpose of wireless LAN client devices and explain how to install, configure, and manage them.

	121.04 Identify the purpose of wireless LAN gateway devices and explain how to install, configure, and manage them.
	121.05 Identify the basic attributes, purpose, and function of types of antennas.
	121.06 Describe the proper locations and methods for installing antennas.
	121.07 Explain the concepts of polarization, gain, beamwidth, and free-space path loss as they apply to implementing solutions that require antennas.
	121.08 Identify the use of wireless LAN accessories and explain how to install, configure, and manage them.
	121.09 Identify, understand, correct or compensate for wireless LAN implementation challenges.
	121.10 Explain how antenna diversity compensates for multipath.
	121.11 Identify and understand the importance and process of conducting a thorough site survey.
	121.12 Identify and understand the importance of the necessary tasks involved in preparing to do an RF site survey.
	121.13 Identify the necessary equipment involved in performing a site survey.
	121.14 Understand the necessary procedures involved in performing a site survey.
	121.15 Identify and understand site survey reporting procedures.
122.0	Develop an awareness of wireless security systems. The student will be able to:
	122.01 Identify the strengths, weaknesses and appropriate uses of wireless LAN security techniques including the use of WVLAN's.
	122.02 Describe types of wireless LAN security attacks, and explain how to identify and prevent them.
	122.03 Given a wireless LAN scenario, identify the appropriate security solution from the following available wireless LAN security solutions.
	122.04 Explain the uses of corporate security policies and how they are used to secure a wireless LAN.
	122.05 Identify how and security precautions are used to secure a wireless LAN.
123.0	Demonstrate knowledge of wireless industry standards. The student will be able to:
	123.01 Identify, apply and comprehend the differences between wireless LAN standards.
	123.02 Understand the roles of organizations in providing direction and accountability within the wireless LAN industry.
	123.03 Identify the differences between the ISM and UNII bands.
	123.04 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

124.0	Participate in simulated work-based learning experiences. The student will be able to:
	124.01 Participate in simulated work-based learning experiences in a network support services environment.
	124.02 Discuss the use of technology in a network support services environment.
	124.03 Discuss the management/supervisors skills needed in a network support services environment.
125.0	Demonstrate a knowledge of general security concepts. The student will be able to:
	125.01 Describe access control.
	125.02 Describe network authentication.
	125.03 Understand the various types of network attacks (backdoors, DOS, spoofing).
	125.04 Identify and modify non-essential services and protocols.
	125.05 Identify malicious code (virus, worm, Trojan).
	125.06 Configure system auditing, logging, and scanning as it relates to security procedures.
126.0	Develop an awareness of communication security concepts. The student will be able to:
	126.01 Describe remote access protocols (VPN, RADIUS, L2TP).
	126.02 Identify E-mail security concerns (hoaxes, spam).
	126.03 Identify web (HTML) security concepts and designs (HTTP/S, IM).
	126.04 Demonstrate an awareness of file transfer security concerns.
	126.05 Describe and identify wireless networking security concerns and vulnerabilities.
127.0	Develop an awareness of network infrastructure security. The student will be able to:
	127.01 Install and configure network firewalls.
	127.02 Identify security concerns with various wiring media (copper, fiber).
	127.03 Identify security concerns associated with removable media and storage devices.
	127.04 Demonstrate an awareness of security topologies (security zones, Intranets, NAT).

	127.05 Configure and use intrusion detection software.
	127.06 Establish security baselines (updates, patches, hot fixes, Access Control lists).
	127.07 Demonstrate the ability to configure a Virtual Private Network (VPN).
	127.08 Describe the function of Network Address Translation (NAT).
128.0	Develop an awareness of cryptography and its relation to security. The student will be able to:
	128.01 Demonstrate an understanding of security algorithms and encryption.
	128.02 Use and apply Public Key Certificates.
	128.03 Demonstrate an understanding of standards and protocols in commerce.
129.0	Incorporate organizational and operational security in an appropriate and effective manner. The student will be able to:
	129.01 Describe how to establish a network security policy.
	129.02 Explain the importance of physical security to protect network resources.
	129.03 Identify and use disaster recovery procedures.
	129.04 Describe the importance of business continuity and its relationship to network and corporate security.
	129.05 Describe security policies and procedures that would be used in a business environment.
	129.06 Explain the importance of privilege management (access, password management, sign-on).
	129.07 Describe the concept of forensics as it applies to network security (obtaining evidence of security breaches).
	129.08 Explain the importance of educating users and supervisors in regard to network security.
	129.09 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