Florida Department of Education
Curriculum Framework

The standards and/or benchmarks for this program were updated for the 2026-27 academic year.

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	
Program Length	1050 hours	
Teacher Certification	Refer to the **Program Structure** section.	
CTSO	PBL, BPA	
SOC Codes (all applicable)	For program SOC codes, please see the Program and Course Tables section of the CTE Program Resources page linked below.	
CTE Program Resources	http://www.fldoe.org/academics/career-adult-edu/career-tech-edu/program-resources.stml	
Basic Skills Level	Computation (Mathematics): 9	Communications (Reading and Language Arts): 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:

			Teacher Certification	
A	OTA0040	Information Technology Assistant	OTA0040 Teacher Certifications	150 hours
B	EEV0504	Computer Support Assistant	BUS ED 1 @2 COMPU SCI 6	150 hours
C	CTS0022	Network Support Help Desk Assistant	COMP SVC 7G	150 hours
D	CTS0023	Network Support Administrator	CYBER TECH 7G	150 hours
E	CTS0024	Senior Network Administrator	INFO TECH 7G	150 hours
F	CTS0029	Wireless Network Administrator		150 hours
G	EEV0317	Data Communications Analyst		150 hours

Florida's Career Readiness Skills for CTE Programs

Employability Skills

01.0	Apply academic skills to workplace scenarios.
	01.01 Use reading skills.
	01.02 Use writing skills.
	01.03 Use mathematical strategies and procedures.
	01.04 Use scientific principles and procedures.
02.0	Design a solution to an industry problem.
	02.01 Use critical thinking.
	02.02 Use creativity.
	02.03 Make sound decisions.
	02.04 Solve problems.
	02.05 Reason.
	02.06 Plan and organize.
03.0	Manage resources within an industry project
	03.01 Manage time.
	03.02 Manage money or resources.
	03.03 Manage materials.
	03.04 Manage personnel.
04.0	Oversee the subcomponents, operations and output of a technical or organizational system.
	04.01 Manage systems.
	04.02 Monitor systems.
	04.03 Improve systems.
05.0	Use information for decision making.
	05.01 Locate information.
	05.02 Organize information.
	05.03 Use information.
	05.04 Analyze information.
	05.05 Communicate information.
06.0	Apply relevant technology to workplace scenarios to aid productivity.
	06.01 Use technology.
07.0	Interpret and express interpersonal communication.
	07.01 Communicate verbally.
	07.02 Listen actively.
	07.03 Comprehend written material.
	07.04 Convey information in writing.
	07.05 Communicate nonverbally.
	07.06 Interpret nonverbal communication.

08.0	Interact with others to accomplish workplace goals.
	08.01 Collaborate with others in a team.
	08.02 Respond to customer needs.
	08.03 Exercise leadership.
	08.04 Negotiate to resolve conflict.
	08.05 Respect others.
09.0	Manage personal behavior to maximize productivity and professional growth.
	09.01 Demonstrate responsibility and self-discipline.
	09.02 Adapt and show flexibility.
	09.03 Work independently.
	09.04 Demonstrate a willingness to learn.
	09.05 Demonstrate integrity.
	09.06 Demonstrate professionalism.
	09.07 Take initiative.
	09.08 Display positive attitude.
	09.09 Take responsibility for professional growth.
Job Attainment	
10.0	Find, assess and apply to job opportunities.
	10.01 Identify online job posts relevant to his or her career aspirations.
	10.02 Compare and contrast the job posts' required qualifications, job duties, compensation, benefits and employers.
	10.03 Define what information, documentation and writing prompts are required for the positions.
11.0	Communicate personal competence, character and fit for a job opportunity.
	11.01 Develop a resume.
	11.02 Write a cover letter.
	11.03 Curate a professional portfolio that includes work products.
	11.04 Prepare for and experience a mock job interview.
12.0	Cultivate and leverage relationships to professionally advance.
	12.01 Request a signed reference letter, letter of recommendation and/or an online skill/professionalism endorsement.
	12.02 Develop a plan to cultivate a professional digital footprint.
	12.03 Develop a networking plan for a specific industry of interest.

Standards

Information Technology Assistant (OTA0040) is the first course in this and other programs within the Information Technology Career Cluster. Standards 01.0 – 15.0 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 technology to accomplish job objectives and enhance workplace performance.
02.0 Demonstrate an understanding of networks.
03.0 Use word processing applications to enhance the effectiveness of various types of documents and communication.
04.0 Use presentation applications to enhance communication skills.
05.0 Use spreadsheet applications to enhance communication skills.
06.0 Use database applications to store and organize data.
07.0 Use electronic mail to enhance communication skills.
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 Develop awareness of computer languages, web-based and software applications, and emerging technologies.
12.0 Demonstrate comprehension and communication skills.
13.0 Use social media to enhance online communication and develop an awareness of a digital footprint.
14.0 Develop an awareness of the fundamentals of cybersecurity.
15.0 Investigate emerging technologies and their impact on the world.
16.0 Incorporate appropriate leadership, customer-service strategies and professional ethics to enhance workplace performance.
17.0 Install, configure, and upgrade desktop and mobile computer systems following industry-standard procedures.
18.0 Diagnose and troubleshoot hardware, software, and connectivity problems.
19.0 Apply safety, maintenance, and environmental sustainability practices.
20.0 Demonstrate understanding of processors, memory and storage technologies.
21.0 Demonstrate knowledge of printing and imaging systems.
22.0 Demonstrate basic networking concepts and connectivity skills.
23.0 Provide effective end-user assistance.
24.0 Demonstrate proficiency using modern graphical user interfaces and productivity tools.
25.0 Incorporate leadership, supervision, customer-service strategies, and ethical standards to enhance workplace performance.
26.0 Perform end-user support and assistance through troubleshooting and communication.
27.0 Understand and explain Internet connectivity and components.
28.0 Define networking terminology and models.
29.0 Connect copper, fiber-optic, and wireless media.
30.0 Perform cable testing and verification.
31.0 Identify network topologies, devices, and connections.
32.0 Explain Ethernet fundamentals and operations.

33.0 Explain the functions of bridges, switches, and VLANs.
34.0 Explain IP addressing and subnetting concepts.
35.0 Differentiate between routed and routing protocols.
36.0 Describe transport and application layer functions.
37.0 Explain WAN connectivity and router functions.
38.0 Perform basic router and switch configuration.
39.0 Troubleshoot network connectivity.
40.0 Describe network security concepts and access controls.
41.0 Use critical-thinking and research skills to solve IT problems.
42.0 Use information-technology productivity tools.
43.0 Demonstrate teamwork, professionalism, and ethics.
44.0 Incorporate leadership, supervision, customer-service strategies, and ethical standards to enhance workplace performance.
45.0 Participate in simulated work-based learning experiences.
46.0 Provide network support and assistance by troubleshooting and diagnosing through direct contact or remote access.
47.0 Perform logical and physical network design activities.
48.0 Demonstrate proficiency in routing protocols and IP configuration for various network designs.
49.0 Demonstrate proficiency in using network traffic filtering to improve network performance and provide basic levels or security.
50.0 Perform network management activities related to documentation, security, performance, administration, and troubleshooting.
51.0 Identify and describe wide-area network (WAN) functions, devices, and design processes.
52.0 Describe the operation and implantation of Virtual Private Networks (VPNs).
53.0 Demonstrate understanding of health, safety and environmental management systems.
54.0 Demonstrate leadership and teamwork skills to accomplish goals and objectives.
55.0 Explain employability and entrepreneurship skills.
56.0 Demonstrate personal money-management concepts and strategies.
57.0 Participate in simulated work-based learning experiences.
58.0 Compare and contrast hierarchical network design models and scalable internetworks.
59.0 Discuss advanced IP addressing management.
60.0 Demonstrate proficiency in router configuration and routing protocols.
61.0 Implement and verify OSPF (single and multi-area).
62.0 Demonstrate proficiency in route optimization and redistribution.
63.0 Demonstrate proficiency in the use of BGP and internet-scale routing.
64.0 Secure routing and infrastructure.
65.0 Configure and support WAN and VPN technologies.
66.0 Demonstrate proficiency in switching technologies and VLAN design.
67.0 Demonstrate multilayer switching and redundancy protocols.
68.0 Demonstrate proficiency with multicast and IGMP.
69.0 Demonstrate network access control and segmentation.
70.0 Use network management and troubleshooting tools.
71.0 Integrate cloud and virtual network technologies.
72.0 Participate in simulated work-based learning experiences.
73.0 Demonstrate proficiency in applying radio frequency (RF) technologies.
74.0 Develop an awareness of wireless LAN technologies.
75.0 Perform implementation and management activities.

76.0 Develop an awareness of wireless security systems.
77.0 Demonstrate knowledge of wireless industry standards.
78.0 Participate in simulated work-based learning experiences.
79.0 Demonstrate a knowledge of general security concepts.
80.0 Develop an awareness of communication security concepts.
81.0 Develop an awareness of network infrastructure security.
82.0 Develop an awareness of cryptography and its relation to security.
83.0 Incorporate organizational and operational security in an appropriate and effective manner.

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

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 – 15.0) have been placed in a separate document. To access this document, visit: Information Technology Assistant (OTA0040)

Course Number: EEV0504
Occupational Completion Point: B
Computer Support Assistant – 150 Hours

16.0	Incorporate appropriate leadership, customer-service strategies and professional ethics to enhance workplace performance. The student will be able to:
16.01	Develop courteous, solution-focused communication methods when assisting customers.
16.02	Demonstrate teamwork, adaptability, and positive attitude in classroom or help-desk simulations.
16.03	Apply ethical and confidentiality standards when handling user data or credentials.
16.04	Document service requests and resolutions accurately using digital ticketing or workflow systems.
17.0	Install, configure, and upgrade desktop and mobile computer systems following industry-standard procedures. The student will be able to:
17.01	Identify major hardware components (motherboard, CPU, memory, storage, power, I/O devices) and describe their functions.
17.02	Recognize modern interface standards (USB-C, HDMI, DisplayPort, Bluetooth, Wi-Fi, Ethernet).
17.03	Assemble, disassemble, and reassemble systems safely using antistatic and ESD precautions.
17.04	Install and configure operating systems (Windows 10/11, Linux, macOS) and required drivers.
17.05	Perform system updates, backups, and recovery procedures.
17.06	Install productivity, collaboration, and endpoint-management applications.
17.07	Configure basic virtualization software for testing or lab use.
17.08	Customize user settings, accessibility features, and regional preferences.
17.09	Explain the importance of firmware/BIOS updates and secure-boot settings.
18.0	Diagnose and troubleshoot hardware, software, and connectivity problems. The student will be able to:
18.01	Apply structured troubleshooting methodologies to isolate faults.
18.02	Use built-in diagnostics, system logs, and Task Manager to analyze performance issues.
18.03	Troubleshoot startup failures, application crashes, and driver conflicts.
18.04	Resolve common peripheral, display, and input/output problems.
18.05	Identify symptoms of failing components and recommend replacement or repair.
18.06	Diagnose basic network-connectivity issues using ping, ipconfig/ifconfig, and Wi-Fi utilities.

	18.07 Apply malware-removal and remediation techniques using approved tools.
	18.08 Document troubleshooting steps and verify operational success with the user.
19.0	Apply safety, maintenance, and environmental sustainability practices. The student will be able to:
	19.01 Follow safe tool usage, lifting, and electrical-safety guidelines.
	19.02 Perform routine cleaning, firmware updates, and hardware checks to maintain reliability.
	19.03 Dispose of electronic waste responsibly (batteries, toner, displays) per EPA and school-district standards.
	19.04 Apply ergonomic principles for workstation design and device placement.
	19.05 Secure devices and data using cable locks, privacy screens, and password protection.
20.0	Demonstrate understanding of processors, memory, and storage technologies. The student will be able to:
	20.01 Differentiate types and speeds of RAM, cache, and storage media (SSD, NVMe, cloud).
	20.02 Install and configure internal and external storage devices.
	20.03 Explain the relationship between CPU cores, threads, and virtualization features.
	20.04 Configure and verify disk partitions and file systems.
	20.05 Describe basic redundancy concepts such as RAID and cloud backup.
21.0	Demonstrate knowledge of printing and imaging systems. The student will be able to:
	21.01 Identify common printer types (laser, inkjet, thermal, multifunction) and their use cases.
	21.02 Install and configure printers locally and on a network.
	21.03 Troubleshoot print queues, driver mismatches, and connectivity issues.
	21.04 Implement environmentally responsible printing practices and consumable recycling.
22.0	Demonstrate basic networking concepts and connectivity skills. The student will be able to:
	22.01 Define networking and describe its purpose in a business environment.
	22.02 Identify the functions of key components (switches, routers, access points, cables).
	22.03 Explain network topologies, IP addressing, and common protocols (TCP/IP, DNS, DHCP).
	22.04 Connect and configure a workstation for wired and wireless access.
	22.05 Verify network connectivity and performance using diagnostic tools.
	22.06 Describe the importance of network security measures such as firewalls and encryption.
	22.07 Perform basic data-backup and restore operations using local or cloud storage.
	22.08 Explain the purpose of disaster-recovery planning and business-continuity concepts.
23.0	Provide effective end-user assistance. The student will be able to:
	23.01 Use professional communication and active-listening techniques when supporting users.
	23.02 Gather and record accurate problem details in a service ticket.
	23.03 Provide step-by-step guidance or remote assistance for basic issues.
	23.04 Escalate unresolved problems following established procedures.
24.0	Demonstrate proficiency using modern graphical user interfaces and productivity tools. The student will be able to:
	24.01 Navigate GUI environments and customize layouts for accessibility and efficiency.
	24.02 Use menus, ribbons, and keyboard shortcuts effectively.
	24.03 Organize and maintain file structures in local and cloud directories.
	24.04 Run multiple applications, manage windows, and multitask securely.
	24.05 Access help systems, documentation, and online knowledge bases for problem-solving.

Course Number: CTS0022
Occupational Completion Point: C
Network Support Help Desk Assistant – 150 Hours

25.0	Incorporate leadership, supervision, customer-service strategies, and ethical standards to enhance workplace performance.The student will be able to:
25.01	Communicate professionally and diplomatically with customers, demonstrating empathy and active listening.
25.02	Document, escalate, and resolve technical incidents following service-desk protocols.
25.03	Demonstrate professional ethics, integrity, and respect for confidentiality in IT environments.
26.0	Perform end-user support and assistance through troubleshooting and communication. The student will be able to:
26.01	Apply first-response procedures for diagnosing hardware, OS, and network issues.
26.02	Gather user information, reproduce problems, and document findings in a ticketing system.
26.03	Use remote-assist tools (Quick Assist, RDP, SSH, or web-based support) to resolve user issues.
26.04	Follow escalation paths and provide post-resolution feedback.
27.0	Understand and explain Internet connectivity and components. The student will be able to:
27.01	Identify physical and logical components required for Internet access (ISP, modem, router, NIC).
27.02	Differentiate between wired and wireless broadband technologies (fiber, cable, DSL, LTE, satellite).
27.03	Configure and test basic network interface settings (IPv4/IPv6, DNS, gateway).
27.04	Use browser settings and plug-ins to verify connectivity and performance.
28.0	Define networking terminology and models. The student will be able to:
28.01	Explain bandwidth, throughput, latency, and jitter.
28.02	Identify units of bandwidth (Kbps, Mbps, Gbps) and performance measurement tools.
28.03	Describe the seven OSI layers and four TCP/IP layers.
28.04	Compare OSI and TCP/IP models and explain their relationship.
28.05	Define networking devices (hub, switch, router, WAP, firewall, access point).
28.06	Differentiate LAN, WAN, MAN, PAN, and VPN networks.
28.07	Explain intranets, extranets, and cloud-based networking.
28.08	Describe the importance of standards bodies (IEEE, IETF, ISO).
29.0	Connect copper, fiber-optic, and wireless media. The student will be able to:
29.01	Explain voltage, current, impedance, and signal loss as they relate to data transmission.
29.02	Identify and terminate twisted-pair (Cat 5e, 6, 6A, 8) connectors using TIA/EIA-568-B standard.
29.03	Describe coaxial and fiber-optic cable types, connectors, and use cases.
29.04	Differentiate between single-mode and multimode fiber and demonstrate safe handling practices.
29.05	Explain PoE, structured cabling, and patch-panel organization.
29.06	Identify wireless standards (Wi-Fi 5/6/6E), frequencies, and channel planning basics.
30.0	Perform cable testing and verification. The student will be able to:
30.01	Use continuity testers, cable certifiers, and TDR meters to verify connectivity.
30.02	Recognize crosstalk, attenuation, and EMI issues.
30.03	Interpret test results to determine pass/fail compliance with current cabling standards.
30.04	Document cable runs, labeling, and test results.

31.0	Identify network topologies, devices, and connections. The student will be able to:
	31.01 Describe star, mesh, and hybrid topologies and their common uses.
	31.02 Differentiate between peer-to-peer and client-server models.
	31.03 Identify network hardware ports, cables, and connectors.
	31.04 Describe SOHO network architecture, router interfaces, and wireless access configuration.
32.0	Explain Ethernet fundamentals and operations. The student will be able to:
	32.01 Explain Ethernet frame structure and MAC addressing.
	32.02 Differentiate between half-duplex and full-duplex communication.
	32.03 Describe auto-negotiation, collision domains, and broadcast domains.
	32.04 Understand link aggregation (LACP) and VLAN tagging (802.1Q).
33.0	Explain the functions of bridges, switches, and VLANs. The student will be able to:
	33.01 Define switching, MAC address tables, and VLAN segmentation.
	33.02 Describe Spanning Tree Protocol (STP/RSTP) and its role in preventing loops.
	33.03 Differentiate between Layer 2 and Layer 3 switches.
	33.04 Troubleshoot common switching issues.
34.0	Explain IP addressing and subnetting concepts. The student will be able to:
	34.01 Describe IPv4 and IPv6 address structure, classes, and subnet masks.
	34.02 Explain public, private, and APIPA addresses.
	34.03 Perform basic subnetting calculations.
	34.04 Configure and test IP addressing on end-user devices.
	34.05 Explain DHCP and DNS roles in address assignment and resolution.
35.0	Differentiate between routed and routing protocols.The student will be able to:
	35.01 Explain the difference between static and dynamic routing.
	35.02 Identify common routing protocols (RIP, OSPF, EIGRP, BGP).
	35.03 Describe how routers forward packets and update routing tables.
	35.04 Verify routing configurations using show, ping, and traceroute commands.
36.0	Describe transport and application layer functions. The student will be able to:
	36.01 Explain TCP and UDP differences.
	36.02 Identify well-known ports and services (HTTP, HTTPS, DNS, RDP, SSH, SMTP).
	36.03 Explain session establishment, acknowledgments, and flow control.
	36.04 Describe encapsulation and decapsulation processes.
37.0	Explain WAN connectivity and router functions. The student will be able to:
	37.01 Describe WAN technologies such as leased lines, broadband, Metro Ethernet, and SD-WAN.
	37.02 Explain router roles, interfaces, and forwarding decisions.
	37.03 Identify common router components and IOS/firmware management.
	37.04 Describe VPN connections and tunneling basics.
38.0	Perform basic router and switch configuration. The student will be able to:
	38.01 Access devices via console, SSH, or web interface.
	38.02 Configure hostnames, passwords, and interface IP addresses.
	38.03 Save, back up, and restore configurations.

	38.04 Upgrade firmware and verify version control.
39.0	Troubleshoot network connectivity. The student will be able to:
	39.01 Use ICMP tools (ping, tracert, pathping) to verify connectivity.
	39.02 Interpret ARP tables and MAC address mappings.
	39.03 Diagnose DNS, DHCP, and default-gateway issues.
	39.04 Resolve common Wi-Fi connectivity and authentication problems.
40.0	Describe network security concepts and access controls. The student will be able to:
	40.01 Explain firewalls, ACLs, and port filtering.
	40.02 Recognize authentication methods (password, MFA, certificate).
	40.03 Describe VPN encryption and secure tunneling.
	40.04 Explain endpoint security best practices (antivirus, patching, updates).
41.0	Use critical-thinking and research skills to solve IT problems. The student will be able to:
	41.01 Apply logical troubleshooting methodologies (CompTIA 6-step model).
	41.02 Perform technical research using documentation and vendor resources.
	41.03 Document problems, solutions, and knowledge-base entries.
42.0	Use information-technology productivity tools. The student will be able to:
	42.01 Employ collaborative tools (Google Workspace, Microsoft 365) for communication and documentation.
	42.02 Use spreadsheets, databases, and reporting tools to track assets and incidents.
	42.03 Utilize ticketing or ITSM software to manage service requests.
43.0	Demonstrate teamwork, professionalism, and ethics. The student will be able to:
	43.01 Collaborate within a help-desk team to meet service-level agreements.
	43.02 Demonstrate ethical handling of user data and credentials.
	43.03 Apply cultural awareness and accessibility principles when supporting diverse users.
Course Number: CTS0023 **Occupational Completion Point: D** **Network Support Administrator – 150 Hours**	
44.0	Incorporate leadership, supervision, customer-service strategies, and ethical standards to enhance workplace performance.The student will be able to:
	44.01 Apply professional communication skills when interacting with users and team members.
	44.02 Demonstrate customer-service excellence, conflict resolution, and diplomacy in technical support situations.
	44.03 Model ethical behavior, confidentiality, and integrity in network operations.
45.0	Participate in simulated work-based learning experiences. The student will be able to:
	45.01 Perform simulated help-desk and network-support tasks using professional ticketing systems.
	45.02 Document incidents, configurations, and resolutions following ITIL/industry-standard practices.
	45.03 Demonstrate collaboration, accountability, and continuous improvement within a technical team.
46.0	Provide network support and assistance by troubleshooting and diagnosing through direct contact or remote access. The student will be able to:
	46.01 Apply structured troubleshooting methodologies to identify and resolve network connectivity issues.

	46.02 Perform local and remote network diagnostics using tools such as ping, traceroute, ipconfig, netstat, and Wireshark.
	46.03 Utilize remote-access platforms (SSH, RDP, VPN) to support distributed users securely.
	46.04 Escalate and document unresolved issues in accordance with service-level agreements.
47.0	Perform logical and physical network design activities. The student will be able to:
	47.01 Identify and resolve common LAN communication and topology problems.
	47.02 Describe the effects and advantages of network segmentation using VLANs and Layer-3 routing.
	47.03 Explain LAN design principles including redundancy, scalability, and fault tolerance.
	47.04 Create and interpret physical and logical network diagrams using industry notation.
	47.05 Select appropriate devices, cabling, and media for new installations or upgrades.
	47.06 Document configurations, IP addressing schemes, and rack/equipment layouts.
48.0	Demonstrate proficiency in routing protocols and IP configuration for various network designs. The student will be able to:
	48.01 Explain IPv4 and IPv6 addressing, subnetting, and Variable Length Subnet Masking (VLSM).
	48.02 Configure and verify static, default, and dynamic routes using protocols such as OSPF and EIGRP.
	48.03 Describe the role of ICMP and routing metrics in path selection.
	48.04 Explain how link-state and distance-vector protocols update routing tables.
	48.05 Implement addressing plans that support scalability and efficient subnet allocation.
49.0	Demonstrate proficiency in using network traffic filtering to improve network performance and provide basic levels of security. The student will be able to:
	49.01 Describe the purpose and operation of ACLs and traffic filters.
	49.02 Configure standard and extended access control lists to permit or deny network traffic.
	49.03 Monitor filtered traffic and verify ACL operation using show/debug commands.
	49.04 Differentiate between stateless and stateful packet inspection methods.
50.0	Perform network management activities related to documentation, security, performance, administration, and troubleshooting. The student will be able to:
	50.01 Maintain network documentation including topology diagrams, device inventory, and configuration backups.
	50.02 Implement security controls such as password policies, multifactor authentication, and least-privilege access.
	50.03 Use monitoring tools (SNMP, Syslog, NetFlow, Zabbix, or PRTG) to analyze performance metrics.
	50.04 Establish performance baselines and plan for capacity or throughput improvements.
	50.05 Apply administrative practices including asset tracking, budgeting, and change-management processes.
	50.06 Identify environmental factors (temperature, humidity, cable management) that affect network reliability.
51.0	Identify and describe wide-area network (WAN) functions, devices, and design processes. The student will be able to:
	51.01 Explain modern WAN technologies including MPLS, Metro Ethernet, broadband, and SD-WAN.
	51.02 Differentiate between private and public WAN connections and their security implications.
	51.03 Design redundant WAN links using VPN tunnels, dual ISPs, or cellular failover.
	51.04 Verify WAN connectivity and troubleshoot routing or encapsulation issues.
52.0	Describe the operation and implementation of Virtual Private Networks (VPNs). The student will be able to:
	52.01 Explain VPN principles including encryption, tunneling, and encapsulation.
	52.02 Differentiate between site-to-site, remote-access, and clientless VPNs.
	52.03 Configure and verify basic IPsec or SSL VPN connections.
	52.04 Describe VPN authentication using RADIUS, LDAP, or certificate services.

53.0	Demonstrate understanding of health, safety, and environmental management systems. The student will be able to:
	53.01 Follow personal and lab safety procedures when working with network hardware and cabling.
	53.02 Explain emergency procedures for electrical, fire, or environmental hazards.
	53.03 Develop a disaster-response and data-backup plan that supports business continuity.
54.0	Demonstrate leadership and teamwork skills to accomplish goals and objectives. The student will be able to:
	54.01 Apply leadership principles to coordinate technical projects and mentor peers.
	54.02 Collaborate effectively within cross-functional teams to resolve network issues.
	54.03 Conduct and document technical meetings and briefings.
	54.04 Promote diversity, inclusion, and respectful communication in the workplace.
55.0	Explain employability and entrepreneurship skills. The student will be able to:
	55.01 Demonstrate positive work habits, adaptability, and professionalism.
	55.02 Develop a personal career and certification plan aligned with IT industry pathways.
	55.03 Research licensing, certification, and continuing-education requirements.
	55.04 Maintain a digital career portfolio of skills, credentials, and achievements.
	55.05 Evaluate employment and entrepreneurship opportunities in networking fields.
56.0	Demonstrate personal money-management concepts and strategies. The student will be able to:
	56.01 Identify and describe the services and legal responsibilities of financial institutions.
	56.02 Describe the effect of money management on personal and career goals.
	56.03 Develop a personal budget and financial goals.
	56.04 Complete financial instruments for making deposits and withdrawals.
	56.05 Maintain financial records.
Course Number: CTS0024 **Occupational Completion Point: E** **Senior Network Administrator – 150 Hours**	
57.0	Participate in simulated work-based learning experiences. The student will be able to:
	57.01 Participate in simulated network engineering tasks using enterprise tools (tickets, monitoring, automation).
	57.02 Collaborate with team members to plan, implement, and document advanced network projects.
58.0	Compare and contrast hierarchical network design models and scalable internetworks. The student will be able to:
	58.01 Demonstrate the use of the three-tier and collapsed-core design models.
	58.02 Describe router and switch functions within the core, distribution, and access layers.
	58.03 Explain principles of resiliency, availability, efficiency, adaptability, and security in modern network design.
59.0	Discuss advanced IP addressing management. The student will be able to:
	59.01 Plan and implement IPv4 and IPv6 addressing schemes using VLSM and CIDR.
	59.02 Explain supernetting, route summarization, and address aggregation.
	59.03 Configure NAT and PAT for IPv4 and describe IPv6 address translation mechanisms.
	59.04 Deploy and manage DHCP services and relay agents (IP helper addresses).
	59.05 Discuss the global IPv6 transition and dual-stack deployment strategies.
60.0	Demonstrate proficiency in router configuration and routing protocols. The student will be able to:

	60.01 Configure static and default routes and implement dynamic routing (OSPFv3, EIGRP).
	60.02 Explain routing convergence, metrics, and path selection.
	60.03 Use show and debug commands to verify routing operation and troubleshoot failures.
	60.04 Document router configuration and change-control procedures.
61.0	Implement and verify OSPF (single and multi-area). The student will be able to:
	61.01 Configure OSPFv3 interfaces and establish adjacencies.
	61.02 Elect Designated and Backup Routers and verify link-state database synchronization.
	61.03 Implement multi-area OSPF and summarize routes for scalability.
	61.04 Use verification commands to monitor neighbors, LSAs, and area connectivity.
62.0	Demonstrate proficiency in route optimization and redistribution. The student will be able to:
	62.01 Control routing updates using filters, prefix lists, and policy routing.
	62.02 Redistribute routes between multiple protocols while preventing loops.
	62.03 Optimize routing performance and stability with timers and administrative distance.
63.0	Demonstrate proficiency in the use of BGP and internet-scale routing. The student will be able to:
	63.01 Explain Autonomous Systems and BGP path-selection processes.
	63.02 Configure eBGP and iBGP sessions, route filters, and communities.
	63.03 Implement redundancy and load-balancing in multi-homed environments.
	63.04 Verify and troubleshoot BGP operations using monitoring commands and logs.
64.0	Secure routing and infrastructure. The student will be able to:
	64.01 Implement router access control lists (ACLs) and control-plane policing.
	64.02 Configure secure management access (SSH, HTTPS, SNMPv3).
	64.03 Harden device configurations and limit unnecessary services.
	64.04 Implement AAA for administrative access using RADIUS or TACACS+.
65.0	Configure and support WAN and VPN technologies. The student will be able to:
	65.01 Explain modern WAN options (MPLS, Metro Ethernet, SD-WAN, VPN).
	65.02 Configure site-to-site and remote-access VPNs using IPsec or SSL.
	65.03 Monitor and troubleshoot WAN connectivity and tunnels.
66.0	Demonstrate proficiency in switching technologies and VLAN design. The student will be able to:
	66.01 Explain switching concepts and the hierarchical model.
	66.02 Configure VLANs, trunks, and VTP (or modern VLAN management techniques).
	66.03 Implement redundancy protocols (STP, RSTP, MSTP).
	66.04 Verify and troubleshoot VLAN and trunk operations.
67.0	Demonstrate multilayer switching and redundancy protocols. The student will be able to:
	67.01 Configure Layer 3 switching with SVIs and inter-VLAN routing.
	67.02 Implement HSRP or VRRP for gateway redundancy.
	67.03 Verify redundant path operations and failover behavior.
68.0	Demonstrate proficiency with multicast and IGMP. The student will be able to:
	68.01 Explain multicast operation and IGMP versions.
	68.02 Configure PIM sparse and dense modes in a lab environment.
	68.03 Verify and troubleshoot multicast group membership and routing.

69.0	Demonstrate network access control and segmentation. The student will be able to:
	69.01 Create and apply network security policies and ACLs.
	69.02 Segment networks using VLANs, ACLs, and private VLANs for security and performance.
	69.03 Integrate switch security features (port security, DHCP snooping, ARP inspection).
70.0	Use network management and troubleshooting tools. The student will be able to:
	70.01 Explain structured troubleshooting methodologies and ITIL incident flows.
	70.02 Utilize SNMP, NetFlow, and Syslog for network monitoring.
	70.03 Use CLI and GUI tools (ping, traceroute, Wireshark, Nmap) for diagnostics.
	70.04 Document and report findings using network diagrams and change records.
71.0	Integrate cloud and virtual network technologies. The student will be able to:
	71.01 Explain virtual network components (VLANs, vSwitches, VXLAN).
	71.02 Configure and manage network interfaces in virtualization platforms.
	71.03 Explain hybrid connectivity between on-premises and cloud networks.
	Course Number: CTS0029 **Occupational Completion Point: F** **Wireless Network Administrator – 150 Hours**
72.0	Participate in simulated work-based learning experiences. The student will be able to:
	72.01 Participate in simulated wireless network support tasks including installation, configuration, and troubleshooting of WLAN components.
	72.02 Use network monitoring and documentation tools to log maintenance activities and technical findings.
	72.03 Demonstrate effective communication, teamwork, and customer service within a wireless support environment.
73.0	Demonstrate proficiency in applying radio frequency (RF) technologies. The student will be able to:
	73.01 Define and apply basic RF behavior concepts including frequency, amplitude, wavelength, and signal attenuation.
	73.02 Explain antenna types (omnidirectional, directional, sector, patch) and their uses in various wireless environments.
	73.03 Identify components affecting RF transmission such as gain, reflection, absorption, and interference.
	73.04 Describe spread-spectrum techniques including DSSS, OFDM, and MIMO as used in modern Wi-Fi standards.
	73.05 Explain channel bonding, bandwidth allocation, and modulation schemes (QAM, OFDMA).
	73.06 Identify FCC regulations governing wireless transmissions including frequency bands, channel spacing, and power limits.
	73.07 Recognize common interference sources (Bluetooth, microwave, IoT) and recommend mitigation strategies.
74.0	Develop an awareness of wireless LAN technologies. The student will be able to:
	74.01 Explain IEEE 802.11 a/b/g/n/ac/ax/be standards and their relative speeds, frequencies, and capabilities.
	74.02 Describe authentication and association processes between clients and access points.
	74.03 Define SSID, BSSID, ESS, and describe client roaming between access points.
	74.04 Explain power management features and their impact on battery life and performance.
	74.05 Differentiate between infrastructure, ad hoc, mesh, and cloud-managed WLAN architectures.
75.0	Perform implementation and management activities. The student will be able to:
	75.01 Determine where wireless LAN technology is suitable based on coverage and performance requirements.
	75.02 Install, configure, and manage wireless access points, controllers, and cloud-based WLAN systems.

75.03	Configure and manage wireless LAN client devices and adapters.
75.04	Install and secure wireless LAN gateways and bridges for inter-network connectivity.
75.05	Identify antenna attributes such as gain, beamwidth, and polarization for proper deployment.
75.06	Plan antenna placement and alignment for optimal coverage and minimal interference.
75.07	Calculate free-space path loss and apply basic link-budget concepts.
75.08	Identify and manage WLAN accessories (PoE injectors, cabling, mounting hardware).
75.09	Diagnose and correct common WLAN challenges such as multipath, reflection, and absorption.
75.10	Explain how antenna diversity and MIMO technologies improve reliability and throughput.
75.11	Conduct a wireless site survey to assess coverage, capacity, and interference.
75.12	Identify required tools and equipment for predictive and active RF site surveys.
75.13	Perform site surveys and document findings with signal maps and heatmaps.
75.14	Analyze results and provide site-survey reports with recommendations.
76.0	Develop an awareness of wireless security systems. The student will be able to:
76.01	Compare wireless security protocols (WEP, WPA2, WPA3) and their relative strengths and weaknesses.
76.02	Identify common WLAN security threats including rogue APs, Evil Twin, deauthentication, and packet sniffing attacks.
76.03	Implement security features such as 802.1X authentication, RADIUS integration, and encryption.
76.04	Apply corporate wireless security policies including password, encryption, and network segmentation standards.
76.05	Use wireless analyzers to detect unauthorized devices and validate network compliance.
77.0	Demonstrate knowledge of wireless industry standards. The student will be able to:
77.01	Differentiate between 2.4 GHz, 5 GHz, and 6 GHz frequency bands, including channel widths and limitations.
77.02	Identify key industry organizations including IEEE, Wi-Fi Alliance, FCC, and IETF, and their roles in WLAN standardization.
77.03	Explain the differences between ISM and UNII bands and their permitted applications.
77.04	Describe power-output regulations and antenna-alignment requirements for point-to-point and point-to-multipoint links.
77.05	Recognize current and emerging wireless technologies such as Wi-Fi 6E/7, IoT, and private 5G.
Course Number: EEV0317 **Occupational Completion Point: G** **Data Communications Analyst – 150 Hours**	
78.0	Participate in simulated work-based learning experiences. The student will be able to:
78.01	Participate in simulated network support activities using help-desk or ticketing systems.
78.02	Use collaboration and documentation platforms to record network incidents and service tasks.
78.03	Demonstrate professional and supervisory skills appropriate for a network support environment.
79.0	Demonstrate a knowledge of general security concepts. The student will be able to:
79.01	Describe access-control models (MAC, DAC, RBAC, Zero Trust).
79.02	Explain authentication and authorization processes (MFA, SSO, identity providers).
79.03	Identify common cyberattacks (phishing, DDoS, spoofing, social engineering, insider threats).
79.04	Harden endpoints by disabling unused services and enforcing secure configuration baselines.
79.05	Recognize and mitigate malware types (viruses, worms, Trojans, ransomware).
79.06	Configure system auditing, logging, and vulnerability scanning to support incident response.

80.0	Develop an awareness of communication security concepts. The student will be able to:
	80.01 Configure secure remote-access solutions (VPN, RADIUS, L2TP, SAML, ZTNA).
	80.02 Identify email-security risks (spam, spoofing, malicious attachments) and apply mitigation techniques.
	80.03 Explain web and application-security concepts (HTTPS, TLS certificates, content filtering).
	80.04 Demonstrate secure file-transfer methods (SFTP, FTPS, encrypted cloud storage).
	80.05 Describe wireless-security protocols (WPA3, 802.1X) and common vulnerabilities.
81.0	Develop an awareness of network infrastructure security. The student will be able to:
	81.01 Install and configure firewalls and access-control lists to protect network segments.
	81.02 Identify physical and signal security considerations for copper and fiber media.
	81.03 Secure removable media and external devices through encryption and policy controls.
	81.04 Describe secure network topologies (DMZ, security zones, NAT, micro-segmentation).
	81.05 Deploy and monitor intrusion-detection and prevention systems (IDS/IPS).
	81.06 Maintain security baselines through updates, patch management, and configuration control.
	81.07 Configure Virtual Private Networks (VPNs) for secure remote connectivity.
	81.08 Explain the role of NAT, firewall rules, and routing policies in network security.
82.0	Develop an awareness of cryptography and its relation to security. The student will be able to:
	82.01 Explain modern encryption algorithms (AES, RSA, ECC) and hash functions (SHA-3).
	82.02 Use digital certificates and PKI to authenticate users and devices.
	82.03 Describe cryptographic standards and protocols used in secure commerce (SSL/TLS, tokenization, digital signatures).
83.0	Incorporate organizational and operational security in an appropriate and effective manner. The student will be able to:
	83.01 Develop and apply a network-security policy and incident-response procedures.
	83.02 Implement physical security controls (badges, locks, cameras, secure racks).
	83.03 Establish and test backup and disaster-recovery plans.
	83.04 Explain business-continuity principles and their relationship to network resilience.
	83.05 Describe acceptable-use, password, and remote-access policies within an organization.
	83.06 Apply privilege management and role-based access to systems and data.
	83.07 Describe digital-forensics concepts related to incident response and evidence handling.
	83.08 Promote security-awareness training for employees and supervisors.
	83.09 Document security standards, procedures, and change-management records.

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.

Career and Technical Student Organization (CTSO)

CTSOs are co-curricular career and technical 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. Other CTSOs not listed in this curriculum framework or recognized by the Florida Department of Education are permissible provided they support student mastery over the standards and benchmarks of this curriculum framework.

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: Computation (Mathematics) and Communications (Reading and Language Arts). 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, 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, F.S., may also be exempted from meeting the Basic Skills requirement. Each school district and Florida College System Institution must adopt a policy addressing procedures for exempting eligible students with disabilities from the Basic Skills requirement as permitted in Section 1004.91, F.S.

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.