



# Regional Occupational Program

## Data Communications Installer 2025-2026

### COURSE DESCRIPTION

Introduces the latest industry standards for proper termination and installation of the CAT 5e/6/6a copper network cabling used in today's modern facilities and smart homes. The most common reason corporate networks struggle to deliver the high bandwidth requirements today is due to improper network installation and termination. In this course you will learn the TIA/ANSI standards, procedures, specifications, and how to resolve complex issues like NEXT crosstalk. This course curriculum can be delivered as a traditional classroom with lab, distance learning model with at home lab kits, or a hybrid program. This course can be taken as a standalone class for entry level employment, or as a concentrator in the ICT Networking pathway. This is not a certification course by itself.

#### Course Information

Course Length: 12 weeks  
 Prerequisite: Manual dexterity with hand tools, small parts; some technology math  
 Course Level: Introductory  
 UC: No  
 Articulated: No  
 Industry Cert.: No  
 Industry Sector: Information Communication Technology  
 Pathway: Networking  
 CALPADS: 8120

#### O\*Net SOC Codes

27-4011 Audio and Video Technicians  
 49-9052 Telecommunications Line Installers and Repairers  
 15-1231 Computer Network Support Specialists  
 49-2098 Security and Fire Alarm Systems Installers

#### Legend

CTE - PS CTE Pathway Standards  
 CRP Career Ready Practices  
 CTE - AS CTE Anchor Standards  
 CCSS Common Core State Standards  
 ISTE International Society for Technology in Education

*Includes updates from 24/25 ICT & Advisory  
[Advisory Minutes](#)*

## Data Communications Installer

### Course Orientation

- a. Discuss objectives for this course, including competencies, teacher expectations, classroom policies, and procedures.
- b. Identify and discuss the acquisition of transferable skills (communication, collaboration, creativity, and critical thinking) and their importance to being college and career ready and for future personal and professional success.
- c. Review objectives, competencies, and course syllabus.
- d. Discuss student and teacher expectations, including behavior, class rules, appropriate dress, pre-course knowledge, and grading policies, including enrollment and attendance requirements and procedures, and classroom/school safety and disaster procedures.
- e. Discuss next steps in course sequence related to the career pathway, the need for reinforcement of basic skills, transferrable skills, and postsecondary and career options.
- f. Discuss the Big Six: Career Ready Essentials and the Standards for Career Ready Practice as they relate to this course, all aspects of the industry sector, and being college and career ready.

## Big Six: Career Ready Essentials

1. Effective Communication	CTE – PS	CRP	CTE - AS	CCSS	ISTE
<ol style="list-style-type: none"> <li>a. <b>Demonstrate effective verbal communication and conflict resolution skills.</b></li> <li>b. <b>Use the writing process to develop written communication with the appropriate tone, organization, and format for the identified audience.</b></li> <li>c. Explain the effect of interpersonal skills on one's ability to communicate effectively and develop relationships.</li> <li>d. Describe the impact of ineffective communication on business relationships.</li> <li>e. Analyze the impact of vocabulary, body language, and tone on verbal communication.</li> <li>f. Demonstrate active listening skills.</li> <li>g. Accurately interpret industry-specific written communication.</li> <li>h. Model responsible and effective use of various communication technologies.</li> <li>i. Identify valid and reliable digital reference and resource materials.</li> <li>j. Gather information from multiple digital sources to compare and contrast, synthesize, and summarize.</li> <li>k. Identify and use appropriate communication and collaboration technologies.</li> <li>l. Utilize technology to problem solve, accomplish tasks, and to produce or publish products.</li> </ol>		<u>1</u> <u>2</u> <u>11</u>	<u>2</u> <u>3</u> <u>4</u> <u>5</u> <u>7</u> <u>8</u> <u>9</u> <u>10</u> <u>11</u>	<u>LS</u> <u>9-10</u> <u>11-12.6</u>  <u>SLS</u> <u>11-12.2</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u>  <u>WS</u> <u>11-12.7</u> <u>11-12.6</u>	<u>1b,c</u> <u>2c</u> <u>3b,c</u> <u>5c</u> <u>6b,c,d</u>
2. Collaboration, Creativity, and Critical Thinking	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ol style="list-style-type: none"> <li>a. <b>Demonstrate critical thinking skills for a variety of purposes and in different settings.</b></li> <li>b. <b>Collaborate to reach consensus on an identical objective through the sharing of knowledge, tasks, and learning.</b></li> <li>c. Discuss the importance of the critical thinking process to real-world applications.</li> </ol>		<u>2</u> <u>4</u> <u>5</u> <u>7</u>	<u>2</u> <u>3</u> <u>4</u> <u>5</u>	<u>LS</u> <u>9-10</u> <u>11- 12.6</u>	<u>1c</u> <u>3c,d</u> <u>4a-d</u> <u>5c,d</u>

<ul style="list-style-type: none"> <li>d. Evaluate the impact of creative thinking on problem solving and innovation in real-world applications.</li> <li>e. Compile work that demonstrates the process used to (elaborate, refine, analyze) evaluate original ideas and maximize creative efforts.</li> <li>f. Apply divergent and convergent thinking to the development of an original idea or solution.</li> <li>g. Examine real-world limits to adopting ideas.</li> <li>h. Demonstrate creative thinking (preparation, insight, evaluation, elaboration, and communication) to create a new idea or concept.</li> <li>i. Assume shared responsibility for collaborative work, and value the individual contributions made by each team member.</li> <li>j. Evaluate evidence, arguments, claims, and beliefs to identify connections.</li> <li>k. Identify bias, prejudice, propaganda, self-deception, distortion, and misinformation.</li> <li>l. Produce intellectual, informational, or material products that serve an authentic purpose.</li> <li>m. Work effectively and respectfully with those from diverse backgrounds or cultures.</li> <li>n. Demonstrate respect, trust, commitment, and the ability to compromise in collaborative projects.</li> </ul>		<u>9</u> <u>10</u> <u>11</u>	<u>7</u> <u>8</u> <u>9</u> <u>11</u>	<u>SLS</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u> <u>11-12.2</u>  <u>WS</u> <u>11-12.7</u> <u>11-12.6</u>	<u>6c</u> <u>7b,c,d</u>
<b>3. Leaders and Teams: Roles and Responsibilities</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
<ul style="list-style-type: none"> <li>a. <b>Determine the individual and team members' roles and responsibilities.</b></li> <li>b. <b>Demonstrate leadership skills and qualities (i.e., reliability, negotiation skills, initiative, positive reinforcement, recognition of others' efforts, problem-solving skills, conflict resolution, and delegation).</b></li> <li>c. Explain the importance of technical, social, and communication skills to team success.</li> <li>d. Compare and contrast leadership styles and their effectiveness in various situations.</li> <li>e. Organize and delegate responsibilities in a team setting to encourage ideas, perspectives, and contributions from all team members.</li> <li>f. Develop a strong sense of team identity by brainstorming solutions, volunteering, assisting others, practicing respect and courtesy, and taking initiative.</li> <li>g. Examine situations in which a follower becomes the leader.</li> <li>h. Describe twenty-first-century skills required across all occupations.</li> <li>i. Identify and discuss the characteristics of a successful team (i.e., leadership, cooperation, and effective decision-making).</li> <li>j. Leverage social and cultural differences to increase innovation and quality of work.</li> </ul>		<u>7</u> <u>8</u> <u>9</u>	<u>3</u> <u>7</u> <u>8</u> <u>9</u> <u>11</u>	<u>SLS</u> <u>11-12.2</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u>  <u>WS</u> <u>11-12.6</u>	<u>7a,c</u>
<b>4. Legal, Ethical, and Environmental Considerations</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
<ul style="list-style-type: none"> <li>a. <b>Demonstrate industry specific ethical and legal practices.</b></li> <li>b. <b>Identify eco-friendly industry specific practices and resources.</b></li> </ul>		<u>5</u> <u>7</u>	<u>3</u> <u>5</u>	<u>WS</u> <u>11-12.6</u>	<u>2a,b</u> <u>3a,b</u>

<ul style="list-style-type: none"> <li>c. Identify local, state, and federal regulatory agencies, entities, laws, and regulations.</li> <li>d. Identify discrimination based on race, nationality, religion, gender, age, disability, or sexual orientation.</li> <li>e. Summarize the ethical and legal implications of workplace discrimination and harassment.</li> <li>f. Explain the concept of corporate citizenship.</li> <li>g. Examine an employer's role in protecting the health and welfare of employees, the community, and the environment.</li> <li>h. Analyze current environmental laws and regulations and their impact on industry.</li> <li>i. Compare and contrast both society's and industry's impact on the environment.</li> </ul>		<u>8</u> <u>12</u>	<u>7</u> <u>8</u> <u>9</u> <u>11</u>	<u>11-12.7</u>  <u>SLS</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u> <u>11-12.2</u>	<u>5c</u> <u>6c</u>
<b>5. Personal Growth and Career Planning</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
<ul style="list-style-type: none"> <li>a. <b>Demonstrate continued personal development and growth.</b></li> <li>b. <b>Develop and manage a personal growth and career plan.</b></li> <li>c. Explain the relationship between sound financial habits and financial security.</li> <li>d. Create and manage a personal financial plan.</li> <li>e. Demonstrate initiative in achieving personal and professional goals.</li> <li>f. Apply time management strategies to meet deadlines.</li> <li>g. Demonstrate a growth mindset through flexibility and a positive attitude.</li> <li>h. Select and demonstrate appropriate job-search and retention techniques.</li> <li>i. Demonstrate strategies to prepare for employment.</li> <li>j. Demonstrate interpersonal skills appropriate for the workplace.</li> <li>k. Elaborate on the importance of perseverance to personal and professional success.</li> <li>l. Discover personal career interests, aptitudes, and skills.</li> </ul>		<u>1</u> <u>2</u> <u>3</u> <u>4</u> <u>6</u>	<u>2</u> <u>3</u> <u>4</u> <u>7</u> <u>8</u> <u>11</u>	<u>LS</u> <u>9-10</u> <u>11-12.6</u>  <u>SLS</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u> <u>11-12.2</u>  <u>WS</u> <u>11-12.6</u>	<u>1a</u> <u>3a,c</u> <u>4d</u> <u>6a,d</u> <u>7b</u>
<b>6. Workplace Safety and Personal Wellness</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
<ul style="list-style-type: none"> <li>a. <b>Demonstrate proper industry specific safe work practices to prevent injury or illness.</b></li> <li>b. <b>Assess the potential impact of goal setting on personal and professional success.</b></li> <li>c. Describe the role of security and emergency procedures in workplace safety.</li> <li>d. Describe the effect of preventative measures on emergencies in the workplace.</li> <li>e. Identify and describe the causes, prevention, and treatment of common accidents.</li> <li>f. Identify local, state, and federal agencies that regulate workplace safety.</li> <li>g. Explain the role of the California Occupational Safety and Health Administration (Cal-OSHA) and the Environmental Protection Agency (EPA).</li> <li>h. Discuss the basics of system operations.</li> <li>i. Demonstrate the proper use of personal protective equipment (PPE).</li> <li>j. Explain the purpose of and accurately interpret a Safety Data Sheet (SDS).</li> <li>k. Identify hazardous materials and chemicals.</li> <li>l. Demonstrate proper procedures to respond to work-related accidents and injuries.</li> </ul>		<u>2</u> <u>5</u> <u>6</u> <u>8</u> <u>12</u>	<u>2</u> <u>5</u> <u>6</u> <u>7</u> <u>8</u> <u>10</u> <u>11</u>	<u>LS</u> <u>9-10</u> <u>11-12.6</u>  <u>WS</u> <u>11-12.7</u> <u>11-12.6</u>  <u>SLS</u> <u>9-10</u> <u>11-12.1</u> <u>11-12.1d</u>	<u>1a,d</u> <u>2a,d</u> <u>5b</u>

<ul style="list-style-type: none"> <li>m. Describe how ergonomics, housekeeping, and maintenance are related to accidents and injuries.</li> <li>n. Demonstrate cyber ethics, cyber safety, and cybersecurity.</li> <li>o. Assess the potential impact of preventative physical and mental health measures on workplace safety.</li> </ul>					
<b>Data Communications Installer Units of Instruction</b>					
<b>7. Modern Networking Systems</b>	CTE-PS	CRP	CTE- AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. Identify the network technologies used today to deliver Internet and voice services.</li> <li>b. Identify common network topologies including Bus and Star.</li> <li>c. Differentiate a server to client architecture with that of a peer-to-peer model.</li> <li>d. Identify and compare different area networks including local, wide area, and metropolitan.</li> <li>e. Compare different network cabling media types and their usage.</li> <li>f. Explain Broadband technology and how it compares to fiber optic, satellite, cellular, and wireless.</li> </ul>	<a href="#">B1.0</a> <a href="#">B1.2</a> <a href="#">B1.3</a> <a href="#">B3.2</a> <a href="#">B3.3</a>	<u>1</u> <u>2</u> <u>4</u> <u>5</u>	<u>1</u> <u>2</u> <u>4</u> <u>5</u> <u>10</u> <u>11</u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.6</a> <a href="#">11-12.7</a>	
<b>8. Cable Installer Operational Planning</b>	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. <b>Make a general planning map of the facility for routing and measuring cable length maximums.</b></li> <li>b. <b>Identify best practices to avoid damaging new wire installations or preexisting components.</b></li> <li>c. Locate building easements for cabling and describe how to establish one.</li> <li>d. Identify maximum cable runs when combined with host patch cord lengths.</li> <li>e. Identify the number of power outlets and network ports needed to service a full computer lab.</li> <li>f. Describe the advantages of an in-room server and network switch.</li> <li>g. Describe cable management practices to prevent damage or risk to the end user.</li> <li>h. Describe the importance of DNS logistics with network cabling design.</li> <li>i. Explain the need to subnet or separate networks of different speeds from local DNS servers.</li> <li>j. Describe cable pulling techniques used for installing wires behind walls, above ceilings, etc.</li> <li>k. Describe a procedure for labeling end points and ports, including a naming system.</li> <li>l. Explain the impact of IoT devices sharing the same LAN as office machines and computers.</li> <li>m. Explain the importance of removing all cut wires and loose parts from a job site.</li> </ul>	<a href="#">B2.0</a> <a href="#">B2.1</a> <a href="#">B2.2</a> <a href="#">B2.3</a>	<u>1</u> <u>2</u> <u>5</u> <u>8</u>	<u>1</u> <u>2</u> <u>5</u> <u>8</u> <u>11</u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>  <a href="#">SLS</a> <a href="#">11-12.1d</a>	

9. Local Area Network Installation and Upgrades	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. Create a LAN map of host devices, switches, and routers including their IP addresses.</li> <li>b. Calculate network bandwidth requirements for audio/video conferencing, HD and 4k video, and computer labs of 24 host devices.</li> <li>c. Starting with the NIC, identify common components that are used to establish a LAN.</li> <li>d. Differentiate the features of hubs, switches, routers, MDFs, and IDFs within a LAN.</li> <li>e. Compare the characteristics of a server client architecture with that of a peer-to-peer model.</li> <li>f. Describe the importance of centralizing the MDF and limiting cable length.</li> <li>g. Identify the supported speeds of 4 twisted pair ethernet standards, such as 100BaseT.</li> <li>h. Explain or calculate the extreme signaling loss of bandwidth when combining different cabling standards, such as 350MHz with 600MHz networks results in a 221MHz peak.</li> <li>i. Identify the needs of disabled customers.</li> <li>j. Explain how techniques such as surveys measure customer satisfaction and obtain feedback.</li> <li>k. Develop strategies to adapt and respond to meeting the differences in culture, markets, habits, experience, and laws.</li> </ul>	<a href="#">B3.3</a>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">4</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">4</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<u><a href="#">LS</a></u> <u><a href="#">9-10</a></u> <u><a href="#">11-12.6</a></u>  <u><a href="#">WS</a></u> <u><a href="#">11-12.6</a></u> <u><a href="#">11-12.7</a></u>  <u><a href="#">SLS</a></u> <u><a href="#">11-12.1d</a></u>	
10. Combining Wi-Fi Routers with Wired LANs	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. Connect a wi-fi router to a wired local area network and measure the performance characteristics of both.</li> <li>b. Access the wi-fi router's Configuration screen using either CLI or a browser.</li> <li>c. Setup the wi-fi router LAN to use auto-DHCP and enable wireless security.</li> <li>d. Identify the performance characteristics of the IEEE 802.11 wireless standards used today.</li> <li>e. Differentiate wi-fi routers from wi-fi access points and range extenders.</li> <li>f. Describe the hardware and software components needed to join a wi-fi network.</li> <li>g. Identify installation factors that can impede the performance of a wi-fi router.</li> <li>h. Describe the changes that can occur when 2 or more routers try to service the same area.</li> <li>i. Create a heat map that illustrates the best installation positioning of a wi-fi router in regard to RF interference.</li> <li>j. Use PING to find host devices are on the network.</li> </ul>	<a href="#">B3.0</a> <a href="#">B3.1</a> <a href="#">B3.5</a> <a href="#">B3.6</a>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<u><a href="#">LS</a></u> <u><a href="#">9-10</a></u> <u><a href="#">11-12.6</a></u>  <u><a href="#">WS</a></u> <u><a href="#">11-12.7</a></u>  <u><a href="#">SLS</a></u> <u><a href="#">11-12.1d</a></u>	
11. Broadband and Mobile Networks	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. Measure the performance of a broadband network connected to all 3 network technologies.</li> <li>b. Verify the host device IP address using the wi-fi router's DHCP client list.</li> <li>c. Describe what a broadband network is and how it compares to other network technologies.</li> <li>d. Explain the dramatic difference between wi-fi 5G, mobile 5G, and ethernet 5G.</li> </ul>	<a href="#">B4.1</a>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">11</a></u>	<u><a href="#">LS</a></u> <u><a href="#">9-10</a></u> <u><a href="#">11-12.6</a></u>  <u><a href="#">WS</a></u> <u><a href="#">11-12.7</a></u>	

e. Explain or demonstrate how a host device could connect to all 3 services. f. Compare the PING times across a broadband network of 2 or more host devices.					
<b>12. Intranets, WANs, and Internet Services</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
a. <b>Connect and configure a router to provide Internet service to host devices on the LAN.</b> b. <b>Demonstrate how to use PING, TRACERT, and ROUTE PRINT to collect specific metrics.</b> c. Differentiate intranets and extranets, and the Internet and the WWW. d. Briefly describe how the internet started when it was called the Arpanet. e. Describe how a wired or wireless LAN can be connected to a WAN or Internet service. f. Demonstrate how to use a network switch to connect additional host devices to the internet. g. Create a network map displaying all identified IP addresses of your host devices. h. Explain the function and importance of Auto DHCP, DNS, and APIPA.	<a href="#">B3.0</a> <a href="#">B3.1</a> <a href="#">B3.2</a>	<u>1</u> <u>2</u> <u>5</u>	<u>1</u> <u>2</u> <u>5</u> <u>11</u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>	
<b>13. TCP/IP Protocol and the OSI Model</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
a. <b>Demonstrate how auto DHCP assigns TCP/IP v4 addresses on a new LAN.</b> b. <b>Assign static IP addressing to host devices on a virtual or physical LAN.</b> c. <b>Demonstrate how to use the TCP/IP command line suite of tools.</b> d. Differentiate the TCP/IP protocol from others, such as NetBEUI. e. Describe the functionality of the TCP protocol compared to the IP protocol. f. Identify the 7 layers of the TCP/IP OSI model and the purpose of each layer. g. Differentiate TCP/IP v4 with TCP/IP v6 IP addressing. h. Describe the best practices for assigning static IP vs dynamic IP addresses. i. Describe the importance of DNS logistics with network cabling design. j. Explain or demonstrate subnetting and how that can impact or enhance the network design.	<a href="#">B1.2</a>	<u>1</u> <u>2</u> <u>5</u>	<u>1</u> <u>2</u> <u>5</u> <u>11</u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>	
<b>14. Twisted Pair Copper Network Cabling</b>	<b>CTE - PS</b>	<b>CRP</b>	<b>CTE - AS</b>	<b>CCSS</b>	<b>ISTE</b>
a. <b>Identify and differentiate the available crimping tools used to terminate wired connections.</b> b. <b>Demonstrate the proper use of crimping, wire stripping, punch down, and other hand tools used to include cable testers when working with RJ45 modular jack installations.</b> c. Explain the EIA/TIA 568a/b standard used for copper network cabling. d. Compare the different performance characteristics of CAT 5E, 6, 6A, and 7 type cables. e. Identify the performance degradation associated with poor wire terminations. f. Describe the best practices for when to use solid copper wire vs stranded wire. g. Describe to a customer when the more expensive shielded cabling is needed. h. Describe the importance of DNS logistics with network cabling design.	<a href="#">B2.0</a> <a href="#">B2.1</a> <a href="#">B2.2</a> <a href="#">B2.3</a>	<u>1</u> <u>2</u> <u>5</u>	<u>1</u> <u>2</u> <u>5</u> <u>11</u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>	

<ul style="list-style-type: none"> <li>i. Explain the concern of installing cabling near power sources, or ceiling lights.</li> <li>j. Explain the concern of using CAT5E keystone jacks with CAT6A wiring infrastructure.</li> <li>k. Describe or demonstrate how to trace an unknown wired port.</li> </ul>					
<b>15. Electrical Signal Integrity and Safety</b>	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. <b>Identify protective measures and risks that affect network quality and safety, such as proper grounding.</b></li> <li>b. <b>Distinguish between AC and DC voltages including why AED's use DC voltage and the additional risks from AC voltage.</b></li> <li>c. Compare high voltage, low voltage, and extra-low voltage transmission characteristics.</li> <li>d. Explain Ohm's Law as it relates to cable length, transmission strength, and POE technology.</li> <li>e. Identify POE or Power Over Ethernet voltage standards used today.</li> <li>f. Explain why plenum sheathed cabling is required for fire safety and when PVC cabling is acceptable.</li> <li>g. Identify regulatory organizations for cable installations including NEC, OSHA, TIA, EIA, ANSI, and BICSI.</li> </ul>	<a href="#">B2.0</a>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>  <a href="#">SLS</a> <a href="#">11-12.1d</a>	
<b>16. Troubleshooting and Quality Assurance</b>	CTE - PS	CRP	CTE - AS	CCSS	ISTE
<ul style="list-style-type: none"> <li>a. <b>Demonstrate how to troubleshoot poor connector termination or intermittent performance loss such as when solid copper wires are bound too tightly.</b></li> <li>b. Describe the symptoms of a network that has too many host devices on auto DHCP.</li> <li>c. Describe what Near End or Far End Cross Talk is and how it is measured.</li> <li>d. Describe what attenuation is and the impact it can have on all electrical circuits.</li> <li>e. Explain the importance of knowing Power Over Ethernet voltage requirements.</li> <li>f. Describe the type of symptoms that occur when a network is not properly grounded.</li> <li>g. Explain how to measure excess voltage on an AC outlet's neutral line and why it is critical.</li> <li>h. Explain the difference between using a network tester compared to a certified network analyzer.</li> </ul>	<a href="#">B2.3</a> <a href="#">B4.1</a>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u>	<u><a href="#">1</a></u> <u><a href="#">2</a></u> <u><a href="#">5</a></u> <u><a href="#">8</a></u> <u><a href="#">11</a></u>	<a href="#">LS</a> <a href="#">9-10</a> <a href="#">11-12.6</a>  <a href="#">WS</a> <a href="#">11-12.7</a>  <a href="#">SLS</a> <a href="#">11-12.1d</a>	

## Standards Alignment

The curricula have been aligned with the CTE Model Curriculum Standards released in 2013. Each industry sector was updated to meet the increased rigor and relevancy requirements of the Common Core State Standards. The curriculum also includes the new Standards for Career Ready Practices.

### Standards for Career Ready Practice

1. *Apply appropriate technical skills and academic knowledge.*
2. *Communicate clearly, effectively, and with reason.*
3. *Develop an education and career plan aligned with personal goals.*
4. *Apply technology to enhance productivity.*
5. *Utilize critical thinking to make sense of problems and persevere in solving them.*
6. *Practice personal health and understand financial literacy.*
7. *Act as a responsible citizen in the workplace and the community.*
8. *Model integrity, ethical leadership, and effective management.*
9. *Work productively in teams while integrating cultural and global competence.*
10. *Demonstrate creativity and innovation.*
11. *Employ valid and reliable research strategies.*
12. *Understand the environmental, social, and economic impacts of decisions.*

## CTE Anchor Standards—Common Core English Language Arts Alignment

### *Anchor Standard 1: Academics*

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the industry sector alignment matrix for identification of standards. Note: alignment listed within each sector.

### *Anchor Standard 2: Communications*

Language Standard: Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the (career and college) readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. LS 9-10, 11-12.6

### *Anchor Standard 3: Career Planning and Management*

Speaking and Listening Standard: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data. SLS 11-12.2

### *Anchor Standard 4: Technology*

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments and information.

### *Anchor Standard 5: Problem Solving and Critical Thinking*

Writing Standard: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, and synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. WS 11-12.7

### *Anchor Standard 6: Health and Safety*

Reading Standards for Science and Technical Subjects: Determine the meaning of symbols, keywords, and other domain-specific words and phrases as they are used in a specific scientific or technical context. RSTS 9-10, 11-12.4

### *Anchor Standard 7: Responsibility and Flexibility*

Speaking and Listening Standard: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly and persuasively. SLS 9-10, 11-12.1

### *Anchor Standard 8: Ethics and Legal Responsibilities*

Speaking and Listening Standard: Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the work. SLS 11-12.1d

### *Anchor Standard 9: Leadership and Teamwork*

Speaking and Listening Standard: Work with peers to promote civil, democratic discussions and decision making; set clear goals and deadlines; and establish individual roles as needed. SLS 11-12.1b

### *Anchor Standard 10: Technical Knowledge and Skills*

Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. WS 11-12.6

### *Anchor Standard 11: Demonstration and Application*

Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in the classroom, laboratory, and workplace settings, and the career technical student organization. Note: no alignment evident for this standard. WS 11-12.

## CTE Model Curriculum Standards—Industry Sectors and Pathways

### **Information and Communication Technologies**

#### **B. Networking**

- B1.0 Identify and describe the principles of networking and the technologies, models, and protocols used in a network.*
- B1.2 List the fundamental elements of the major networking models established by the industry standards of recognized organizations: the Open System Interconnect (OSI) or transmission-control/Internet protocol (TCP/IP) models.*
- B1.3 Identify and explain how data, voice, and video/communications are carried through the most common network media.*
- B2.0 Identify, describe, and implement network media and physical topologies.*
- B2.1 Use appropriate wiring and wireless standards and plan, install, and maintain media (copper, fiber, and wireless) for a variety of network systems.*
- B2.2 Demonstrate standard procedures and practices for safely using tools and working safely around the electrical environment in various networking systems.*
- B2.3 Test and maintain wired and wireless network communications components and systems.*
- B3.0 Install, configure, and differentiate between common network devices.*
- B3.1 Identify and describe the functions of various network devices, including network connectivity hardware.*
- B3.2 Describe the differences between various network environments: peer-to-peer, client-server, thin client, virtualized, internetworks, intranets, and extranets.*
- B3.3 Distinguish between the topologies and protocols of local area networks and those of wide area networks.*
- B3.5 Configure the major addressing and routing protocols used in networking.*
- B3.6 Implement a functional wired and wireless network, including the installation and configuration of components, software, and plug-ins.*
- B4.1 Identify and use network tools to troubleshoot and verify network availability and performance.*

## ISTE Standards for Students

**1. Empowered Learner-** *Students leverage technology to take an active role in choosing, achieving, and demonstrating competency in their learning goals, informed by the learning sciences.*

- a) Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process itself to improve learning outcomes.*
- b) Students build networks and customize their learning environments in ways that support the learning process.*
- c) Students use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways*
- d) Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.*

**2. Digital Citizen-** *Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world, and they act and model in ways that are safe, legal, and ethical.*

- a) Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.*
- b) Students engage in positive, safe, legal, and ethical behavior when using technology, including social interactions online or when using networked devices.*
- c) Students demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.*
- d) Students manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.*

**3. Knowledge Constructor-** *Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts, and make meaningful learning experiences for themselves and others.*

- a) Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.*
- b) Students evaluate the accuracy, perspective, credibility, and relevance of information, media, data, or other resources.*
- c) Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.*
- d) Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories, and pursuing answers and solutions.*

**4. Innovative Designer-** *Students use a variety of technologies within a design process to identify and solve problems creating new, useful, or imaginative solutions.*

- a) Students know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts, or solving authentic problems.*
- b) Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.*
- c) Students develop, test, and refine prototypes as part of a cyclical design process.*
- d) Students exhibit a tolerance for ambiguity, perseverance, and the capacity to work with open-ended problems.*

**5. Computational Thinker-** *Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.*

- a) Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.*
- b) Students collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.*
- c) Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.*

*d) Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.*

**6. Creative Communicator-** *Students communicate clearly and express themselves creatively for a variety of purposes using platforms, tools, styles, formats, and digital media appropriate for their goals.*

*a) Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.*

*b) Students create original works or responsibly repurpose or remix digital resources into new creations.*

*c) Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.*

*d) Students publish or present content that customizes the message and medium for their intended audiences.*

**7. Global Collaborator-** *Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.*

*a) Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.*

*b) Students use collaborative technologies to work with others, including peers, experts, or community members, to examine issues and problems from multiple viewpoints.*

*c) Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.*

*d) Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.*