Unit/Standard Number	High School Graduation Years 2022, 2023 and 2024 **Computer System Networking and Telecommunications** **CIP 11.0901** **Task Grid**	Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
	Secondary Competency Task List	
100	**PERSONAL AND ENVIRONMENTAL SAFETY**	
101	List common causes of accidents and injuries in a computer facility.	
102	Wear personal protective equipment.	
103	List and identify safety hazard symbols.	
104	Review Safety Data Sheets (SDS) and explain their requirements in handling hazardous materials.	
105	Describe types of fire extinguishers and explain which types to use for extinguishing various fires.	
106	Use safe procedures to follow when lifting and carrying heavy objects.	
107	Describe the importance of safety as it relates to environmental issues.	
108	Identify potential hazards when working with power supplies.	
109	Identify proper disposal procedures for batteries, display devices, and all other electronic equipment.	
110	Identify proper disposal procedures for chemical solvents and pressurized cans.	
111	Prevent Electro Static Discharge conditions.	
112	RESERVED	
113	Configure a computer's power management settings to maximize energy efficiency.	
114	Maintain safe work area to avoid common accidents and injuries.	
160	Identify and follow safety precautions associated with computer use	
200	**COMPUTER HARDWARE**	
201	Categorize storage devices and backup media.	
202	Categorize the different types of computer cases.	
203	Explain motherboard components, types, and features.	
204	Categorize power supplies types and characteristics.	
205	Explain the purpose and characteristics of CPUs and their features.	
206	Explain cooling methods and devices.	
207	Compare and contrast memory types, characteristics, and their purpose.	
208	Distinguish between the different display devices and their characteristics.	
209	Summarize the function and types of adapter cards.	
210	Install and configure peripherals and input devices.	
211	Configure and optimize portable devices, such as laptops, tablets, and smart devices.	
212	Install and configure printers.	
213	Install configure and maintain personal computer components.	
214	Repair/replace desktop and laptop computer components.	
215	RESERVED	
216	Implement RAID solutions.	

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260	Understand how software manages hardware resources	
261	Use tools (both hardware and software) that enable the support Personal Computers	
262	Resolve hardware conflicts	
300	**TROUBLESHOOTING, REPAIR AND MAINTENANCE**	
301	Apply industry standard troubleshooting methods.	
302	Troubleshoot common hardware and operating system symptoms and their causes.	
303	RESERVED	
304	Identify common laptop issues and determine the appropriate basic troubleshooting method.	
305	Integrate common preventative maintenance techniques.	
306	RESERVED	
307	Diagnose and repair common printer issues.	
360	Given a network troubleshooting scenario involving a wiring/wireless infrastructure problem, identify the cause of the problem (e.g., bad media, interference, network hardware)	
400	**OPERATING SYSTEMS AND SOFTWARE**	
401	Identify different operating systems by their features.	
402	Use various user interfaces.	
403	Install and configure an operating system.	
404	Explain boot sequences, methods and startup utilities for various operating systems.	
405	Select the appropriate commands and options to troubleshoot and resolve problems.	
406	Differentiate between various operating system directory structures.	
407	Use system utilities/tools and evaluate the results.	
408	Troubleshoot common OS and software issues.	
409	Manage local users, groups and institute local security policies.	
410	Install and configure a network and workstation operating system.	
460	Explain and document the advantages and limitations of various network operating systems to suport selection of an operating system.	
461	Understand how the user interfaces with the command line, Windows 10, Windows 11, and Unix/Linux Operating Systems	
500	**NETWORK TECHNOLOGIES**	
501	Explain the function of common networking protocols, such as FTP, TCP/IP suite, DHCP, DNS.	
502	Identify commonly used TCP and UDP default ports, including TCP ports: FTP – 20, 21, SSH – 22, TELNET – 23, HTTP – 80.	
503	Identify address formats, including IPv6, IPv4, MAC.	

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504	Evaluate the proper use of addressing technologies and addressing schemes, including: subnetting: classful vs. classless, NAT, PAT, SNAT, public vs. private, DHCP, addressing schemes (unicast, multicast, broadcast).	
505	Identify common IPv4 and IPv6 routing protocols, including link state, distance vector, and hybrid protocols.	
506	Explain the purpose and properties of routing, including IGP vs. EGP, static vs. dynamic, next hop, interpret routing tables and how they pertain to path selection, convergence (steady state).	
507	Identify the characteristics of wireless communication, including 802.11 and 802.15 standards: speeds, distance, channels, frequency, authentication, and encryption.	
508	Identify the basic elements of unified communication technology, such as VoIP, video, real time services, POS, and UC devices	
509	Implement technologies that support cloud computing.	
510	Implement virtualization technologies.	
560	Given an example, identify a MAC address	
561	Identify the seven layers of the OSI Model and their functions	
563	Identify the purpose of the following network services: DHCP, BOOTP, DNS, NAT?ICS, WINS, SNMP	
564	Identify the purpose of subnetting and default gateways	
565	Identify the basic charactistics (e.g., speed, capacity, media) of the following WAN technologies: Packet switching vs. circuit switching, ISDN, FDDI, ATM, Frame Relay, SONET/SDH, T1/E1, T3/E3, OCx	
600	**NETWORK MEDIA AND TOPOLOGIES**	
601	Categorize standard cable types and their properties including: UTP, STP, coaxial, fiber; plenum vs. non-plenum properties: transmission speeds, distance, duplex, noise immunity, frequency.	
602	Identify common connector types, including UTP, STP, coaxial, and fiber.	
603	Identify common physical network topologies.	
604	Differentiate and fabricate cables according to TIA/EIA 568A and 568B standards, including patch, crossover, and rollover cables.	
605	Categorize common WAN technology types and properties.	
606	Categorize common LAN technology types and ethernet properties: CSMA/CD, broadcast, collision, bonding, speed, distance.	
607	Explain common logical network topologies and their characteristics, including peer to peer and client/server.	
608	Install components of wiring distribution, including vertical and horizontal cross connects, verify installation and termination and environmental requirements.	
660	Recognize the following media connectors and/or describe their uses: RJ-11, RJ-45, BNC, ST, and SC	
661	Identify the purpose, features, and functions of the following network components: Hubs, Switches, Bridges, Routers, Gateways, CSU/DSU, NICs/ISDN adapters/system area network cards, Wireless access points, and Modems	
700	**NETWORK DEVICES**	
701	Install, configure and differentiate between common network connectivity devices.	

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702	Identify the functions of specialized network devices such as, multilayer switch, content switch, IDS/IPS, load balancer, multifunction network devices, DNS server, bandwidth shaper, proxy server, CSU/DSU.	
703	Explain the advanced features of a switch, such as PoE, spanning tree, VLAN, trunking, port mirroring, port authentication	
704	Install a basic wireless network, including client configuration, access point placement and Installation.	
705	Configure appropriate encryption, configure channels and frequencies, set ESSID and beacon, verify installation.	
760	Identify the main characteristics of VLANs	
761	Identify the main characteristics of network attached storage	
762	Identify the purpose and characteristics of fault tolerance	
763	Identify the purpose and characteristics of disaster recovery	
764	Given a remote connectivity scenario (e.g., IP,dial-up, PPoE, authentication, physical connectivity, etc.) configure the connection	
800	**NETWORK MANAGEMENT**	
801	Explain, compare, and contrast the layers of the TCP/IP and OSI models.	
802	Prepare physical and logical network diagrams, baselines, policies, procedures, and configurations and regulations.	
803	Evaluate the network based on configuration management documentation, such as wiring schematics; physical and logical network diagrams; baselines; policies, procedures, and configurations to network devices and infrastructure; wiring schematics; physical and logical network diagrams; and configurations and job logs.	
804	Conduct network monitoring to identify performance and connectivity issues, such as packet sniffers, connectivity software, load testing, throughput testers, system logs, history logs, and event logs.	
805	RESERVED	
806	Implement remote management technologies.	
860	Given a troubleshooting scenario involving a small office/home office network failure (e.g., xDSL, cable, home satellite, wireless, POTS), identify the cause of the failure	
861	Given a wiring task, select the appropriate tool (e.g., wire crimper, media tester/certifier, punch down tool, tone generator, optical tester, etc.)	
900	**NETWORK TOOLS AND TROUBLESHOOTING**	
901	Utilize command line/graphical tools and interpret the output to verify functionality including, Traceroute, Ipconfig, Ifconfig, and Ping.	
902	Use network scanners, such as packet sniffers, intrusion detection software, Intrusion prevention software, and port scanners.	
903	Utilize the appropriate hardware tools for cable fabrication and troubleshooting.	
904	Implement network troubleshooting methodologies, including information gathering – identify symptoms and problems, identify the affected areas of the network.	
905	Develop an action plan and solution identifying potential effects, implement and test the solution, identify the results and effects of the solution, document the solution, and the entire process.	

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906	Troubleshoot common wired and wireless connectivity issues and select an appropriate solution to include physical and logical issues.	
907	Troubleshoot and resolve common WAN issues, such as loss of connectivity, DNS, router configurations, and default gateways.	
960	Demonstrate knowledge of the procedures of Security Baselines and OS/NOS Hardening (Hot Fixes, Service Packs, Patches), Network Hardening (Updates, Configuration, Access Control Lists, Enabling/Disabling Services & Protocols), and Application Hardening	
961	Identify the various security concerns surrounding the following network media: Coax cable, UTP/STP, Fiber Optic cable, and all forms of removable media	
1000	**SECURITY FUNDAMENTALS**	
1001	Configure hardware and software security devices, such as network-based firewall, host-based firewall, DMZ, IDS, IPS, VPN concentrator.	
1002	Implement features of a network firewall, such as application layer vs. network layer, stateful vs. stateless, scanning services, content filtering, signature identification, zones.	
1003	Configure network access security, such as ACL: MAC filtering, IP filtering tunneling and encryption: SSL VPN, VPN, L2TP, PPTP and related others.	
1004	Differentiate the principals of user authentication, such as PKI, Kerberos, AAA: RADIUS, TACACS+, network access control: 802.1x, CHAP, MS-CHAP, EAP.	
1005	Evaluate issues that affect device security, such as physical security and network access.	
1006	Identify and mitigate common security threats.	
1007	Demonstrate security features, including BIOS security, password management, locking workstations, and biometrics.	
1008	Demonstrate basic forensic concepts, such as incident response, chain of custody, evidence preservation, and documentation.	
1060	Become familiar with the Laws and Regulations surrounding Network Technology Security (e.g., portion > SOCS, NIST-CBF, PCI, and ISO, HIPAA, Privacy Act, ECPA, electronic surveilance, and Acceptable Usage Policies) (GDPR, PCI compliance, DFARS)	
1061	Develop an awareness of Computer Forensics, including knowing what your role as a Network Admin/Engineer is in the process of collecting/preserving evidence and the Chain of Custody	
1062	Demonstrate an understanding of Disaster Recovery Techniques and Planning: preparing for an incident, incident response, disaster recovery	
1063	Demonstrate a knowledge of Traning related issues surrounding Network Security, inlcuding training for end users, Executives and human Resource personnel	
1064	Understand the concepts and practices surrounding Physical Security, including Access Control, Social Engineering, and the Environment	
1065	Security/ACL for cloud service/provider platforms (e.g. Microsoft Azure and Amazon AWS)	
1100	**COMMUNICATON AND PROFESSIONALISM**	

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1101	Use effective communication with customers, such as proper etiquette, active listening, and cultural sensitivity.	
1102	Solve customer problems.	
1103	Implement and adhere to acceptable use policies.	
1104	Maintain customer confidentiality.	
1105	Maintain asset inventory.	