

Unit/Standard Number	High School Graduation Years 2022, 2023 and 2024		Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
	<b>Electrical and Power Transmission Installers, Other</b> <b>CIP 46.0399</b> <b>Task Grid</b>		
	<b>Secondary Competency Task List</b>		
<b>100</b>	<b>BASIC SAFETY</b>		
101	Inspect and use personal protective equipment.		
102	Identify causes of job site accidents.		
103	RESERVED		
104	RESERVED		
105	Properly don fall protection.		
106	Identify four classes of fire extinguishers.		
107	Confirm circuits are de-energized before working on them.		
108	Perform lockout/tagout.		
109	Inspect and use ladders.		
110	Complete jobsite hazard analysis form.		
111	Identify arc-flash hazards and protection (NFPA70E).		
160	Identify and follow the Electrical and Network Cabling Technology Program's rules and procedures		
161	Identify organizations that set safety, building, and material standards such as U.L., NEMA, BOCA, and OSHA		
162	OSHA 10 hour Construction Industry Certification		
<b>200</b>	<b>HAND TOOLS</b>		
201	Use screwdrivers.		
202	Use pliers.		
203	Use a keyhole/drywall saw.		
204	Use a hydraulic knockout/punch tool.		
205	Use a tape measure.		
206	Use wire strippers.		
207	Use wire cutters.		
208	Use a utility knife.		
209	Use a torpedo level.		
210	Use a hammer.		
211	Use a conduit reamer.		
212	Use a hacksaw.		
213	Use an MC Cable splitter (roto-split).		
214	Use an adjustable or non-adjustable wrenches.		
215	Use a ratchet and sockets.		
216	Use nut drivers.		
<b>300</b>	<b>POWER TOOLS</b>		
301	RESERVED		
302	Use a hammer drill.		
303	Use a reciprocating saw.		
304	Use a portable hand-held band saw.		
305	RESERVED		
306	Use a drill.		

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307	RESERVED		
308	RESERVED		
309	RESERVED		
310	Use an oscillating multi purpose tool.		
311	Use impact driver.		
<b>400</b>	<b>BLUEPRINT READING</b>		
401	Identify types of blueprint plans.		
402	Identify blueprint symbols.		
403	Interpret blueprint plans.		
404	RESERVED		
405	Develop electrical details on a blueprint.		
406	Use a measuring tool to scale.		
<b>500</b>	<b>ANCHORS AND SUPPORTS</b>		
501	Identify, select and install various types of anchors and supports.		
<b>600</b>	<b>RESIDENTIAL CABLING TECHNOLOGY</b>		
601	Install non-metallic (NM) Cable.		
602	Install metal-clad cable (MC).		
603	RESERVED		
604	RESERVED		
605	Terminate a coaxial cable.		
606	RESERVED		
607	RESERVED		
608	RESERVED		
609	Identify telecommunications cable types.		
610	Terminate a RJ45 connector.		
611	Install SE cable.		
612	Terminate and splice conductors.		
660	Demonstrate proper terminations and splicing techniques		
661	Install Underground feeder (UF) cables		
662	Acheive C-Tech Certification for copper network cabling and fiber optics		
663	Explain Fiber optic concepts, components and installation procedures		
<b>700</b>	<b>SWITCHES AND RECEPTACLES CIRCUITS</b>		
701	Install a duplex receptacle.		
702	Install a single pole switch.		
703	Install a 3-way switch.		
704	Install a 4-way switch.		
705	Install a split-wired duplex receptacle.		
706	Install a Ground Fault Circuit Interrupter (GFCI) receptacle.		
707	Install an Arc-Fault Circuit Interrupter (AFCI).		

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708	Install a time control switch.		
709	Install a range receptacle.		
710	Install a dryer receptacle.		
711	Install various branch circuits.		
712	Install connected/ smart devices.		
760	Wire a photo transmitter and photo receiver to control two lights		
761	Install old work devices		
<b>800</b>	<b>FIXTURES</b>		
801	Install surface-mounted lighting fixture.		
802	Install recessed lighting fixtures.		
803	Install a ceiling fan.		
804	Install special purpose lighting.		
805	Identify IC and non-IC recessed lighting fixtures.		
860	Install exit and emergency lighting		
861	Explain operation and construction of various lighting systems (i.e. fluorescent, incandescent, HD)		
<b>900</b>	<b>RACEWAYS</b>		
901	Install Electrical Metallic Tubing (EMT).		
902	RESERVED		
903	Design a surface raceways system (wiremold).		
904	Install flexible raceway.		
905	RESERVED		
906	RESERVED		
907	RESERVED		
908	Bend a stub 90°.		
909	Bend an offset.		
910	Bend a back to back 90°.		
911	Cut, ream, and deburr raceway systems.		
912	Install conductors in a raceway system.		
960	Install Rigid Metal Conduit		
<b>1000</b>	<b>WIRED DEVICES</b>		
1001	Install a hard wired smoke detector.		
1002	Install door-bell system.		
1003	Trim out electrical devices.		
1004	Install an occupancy sensor.		
1005	Install a photocell.		
<b>1100</b>	<b>TESTING EQUIPMENT</b>		
1101	Use a multimeter to test a circuit.		
1102	RESERVED		
1103	Use a plug-in circuit tester.		

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1104	Use a clamp-on ammeter.		
1105	RESERVED		
1106	Use a circuit tracer.		
1107	Use a network cable tester.		
1108	Apply Ohm's/Watt's law calculations to electrical applications.		
<b>1200</b>	<b>ELECTRICAL SERVICE</b>		
1201	Install an overhead service.		
1202	Identify parts of an underground service.		
1203	RESERVED		
1204	RESERVED		
1205	RESERVED		
1206	RESERVED		
1207	RESERVED		
1208	RESERVED		
1209	Identify types of safety disconnect switches.		
1210	Terminate a service panel/load center/sub-panel.		
1260	Identify a panel with a manual and automatic transfer switch		
1261	Make a live service connection.		
<b>1300</b>	<b>NATIONAL ELECTRICAL CODE</b>		
1301	Identify the purpose of the NEC.		
1302	Use Chapter 9 Tables.		
1303	Use the NEC as a reference to questions and competencies that students perform for all electrical installations.		
1304	Identify the publisher of the NEC.		
1305	Identify the code cycle of the NEC.		
1306	RESERVED		
<b>1400</b>	<b>GREEN TECHNOLOGY</b>		
1401	Identify renewable energy sources.		
1402	Identify procedures for installing a wind turbine system.		
1403	RESERVED		
1404	Identify procedures for installing a solar energy system.		
1405	RESERVED		
1406	RESERVED		
1407	Evaluate the demand and consumption of electrical energy.		
<b>3000</b>	<b>AC/DC FUNDAMENTALS</b>		
3060	Identify electrical parts and their symbols		
3061	Demonstrate the generation of AC and DC electricity		
3062	Identify the parts of a complete circuit		
3063	Describe atomic structure of copper and aluminum		
3064	Identify and differentiate between conductors and insulators		

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3065	Covert from metric units to decimal units		
3066	Define voltage, current, and resistance		
3067	Use Ohm's Law to calculate unknown values of voltage current and resistance		
3068	Trace and calculate the distribution of power, voltage, current, and resistance in a combination circuit		
3069	Demonstrate the effects of magnetism and electromagnetism		
3070	Explain the construction and operation of DC generators and AC single and three phase alternates		
3071	Describe characteristics of RLC circuits		
<b>3100</b>	<b>INSTALLATION OF RELAYS</b>		
3160	Describe the operation of electromechanical and solid state relays		
3161	Connect a electromechanical relay for 24 volt control and switching		
3162	Connect a relay for 24 volt control and 120 volt switching		
3163	Wire a door and window alarm system using relays		
3164	Connect start/stop stations to control		
3165	Connect timing relays to control various outputs.		
3166	Wire a solid state relay to control a heater circuit with thermostat		
<b>3200</b>	<b>MOTORS AND CONTROLS</b>		
3260	Explain the operation and application of various motor configurations		
3261	Wire a single pole switch controlling a single phase motor		
3262	Connect a hand-off-automatic switch to a single phase motor		
3263	Install a drum switch controlling a single phase motor		
3264	Wire start/stop to control motors		
3265	Wire a 208 volt motor controlled by a 120 volt coil using a transformer		
3266	Install a single phase motor being controlled by a time delay relay		
3267	Wire a jog button controlling a single phase motor		
3268	Wire two jog buttons controlling two single phase motors that are electrically interlocked		
3269	Connect two single phase motors controlled by push button interlock		
3270	Install a single phase motor controlled by a start stop station using mechanical breaking		
3271	Connect a 120 volt single phase motor controlled by a 24 volt thermostat		
3272	Describe the operation and applications of three phase squirrel cage induction motors		
3273	Describe the operation and applications of a three phase wound round motor		
3274	Describe the operation and applications of a three phase synchronous motor		
3275	Wire a three phase motor with an across the line starter		
3276	Wire a three phase motor with a drum switch		
3277	Wire two three phase motors with electric interlock		
3278	Wire two three phase motors with push button interlock		
3279	Wire a three phase motor with a jog button		
3280	Wire two three phase motors with two jog buttons and electrical interlock		
3281	Wire a three phase motor for plugging		
3282	Wire a three-phase motor using an AC frequency drive		
<b>3600</b>	<b>PROGRAM AND OPERATE PROGRAMMABLE CONTROLLERS</b>		

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3660	Identify and describe the purpose, construction and applications of a PLCs		
3661	Convert between the decimal, binary, and hexadecimal numbering systems		
3662	Describe addressing and wiring techniques of PLC inputs and outputs		
3663	Program and wire all of the relay tasks as prescribed in DUTY J		
3664	Program and wire simple timing circuits		
3665	Program and wire simple counter circuits		
3666	Program and wire shift register circuits		
3667	Program and wire sequencer circuits		
3668	Program and wire analog circuits used in process control		
<b>3700</b>	<b>TRANSFORMERS</b>		
3760	Explain the basic principles of single phase transformer		
3761	Wire a step-down and a step-up transformer		
3762	Connect a transformer for additive and subtractive polarities		
3763	Construct a distribution transformer from two 120 volt single phase transformers		
3764	Explain the basic principles of three phase transformer design and operation		
3765	Explain the basic principles of wye and delta transformer design		
3766	Connect three single phase transformers to form one three phase transformer for wye-wye, delta-wye, delta-delta, and wye delta operation		
<b>3900</b>	<b>PURCHASING AND ESTIMATING</b>		
3960	Interpret prices from vendor's catalogs		
3961	Fill out a purchase requisition		
3962	Estimate the cost of a small job		
3963	Determine best price using quotes		
<b>4000</b>	<b>FIRE AND SECURITY SYSTEMS</b>		
4060	Install smoke detectors, strobe lights, and horns		
4061	Install programmable and non-programmable fire alarm panel		
4062	Install security system using discrete components hard wired		
4063	Install security system with programmable features		
<b>4100</b>	<b>PROFESSIONAL DEVELOPMENT</b>		
4160	Join and participate in a CTE student organization (Skills USA)		
4161	Plan and conduct Skills USA meetings		
4162	Participate in a professional development program		
4163	Complete a job application form		
4164	Prepare a resume		
4165	Participate in a mock job interview		
4166	Write a letter of application		
4167	Identify career and training opportunities		