

Crawford County
Career  **Technical**
 Center

Unit/Standard Number	Electrical, Electronic and Communications Engineering Technology/Technician CIP 15.0303 Task Grid	Proficiency Level Achieved: (X) Indicates Competency Achieved to Industry Proficiency Level
Secondary Competency Task List		
100	SAFETY	
101	Demonstrate an understanding of state, school and OSHA safety regulations.	
102	Practice safety techniques for electronics work.	
103	Demonstrate an understanding of proper fire drill procedures.	
104	Interpret Safety Data Sheets (SDS).	
105	RESERVED	
106	Explain the environmentally-safe disposal procedures for electronics equipment.	
107	Describe the physiological reaction to electrical shock causes.	
200	ELECTRICAL QUANTITIES AND COMPONENTS	
201	Recognize the basic units of Electronic Measurements.	
202	Recognize ISM system of measurement (International Systems of Measurements).	
203	Express numbers in scientific Engineering notation.	
204	Convert one power of ten to another power of ten.	
205	Use the resistor color code.	
206	Identify component symbols used in electronic schematic diagrams.	
207	Identify schematic symbols for various types of electrical and electronic components.	

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208	Identify semiconductors and their usage.	
300	INSTRUMENTATION	
301	Demonstrate the use of a multi-meter, function generator, and frequency counter to measure voltage, resistance and current.	
302	Make a circuit measurement to solve current requirements.	
303	Demonstrate the proper method of using an ohmmeter.	
304	Demonstrate the use of a power supply and adjust it to specified values.	
400	OHM'S LAW	
401	Utilize Ohm's law to determine current, voltage, or resistance.	
402	Demonstrate an understanding of the meaning of and relationship between voltage, current, resistance, and power in DC using Ohm's Law Pie Chart.	
403	Demonstrate the linear relationship between current and voltage.	
404	Describes the relationship between voltage, current and power in an electric circuit using Watt's Law.	
405	Calculate nominal resistor using the resistor color code.	
500	SERIES CIRCUITS	
501	Demonstrate how voltages are distributed around a series circuit.	
502	Utilize double subscript notation.	
503	Demonstrate Kirchhoff's Voltage Law.	
504	Demonstrate voltage distribution and polarity of power supplies and resistors in a series circuit.	
505	Demonstrate calculations of power in a series circuit.	
506	Demonstrate troubleshooting open circuits and short circuits in a series circuit.	
600	PARALLEL CIRCUITS	
601	Calculate resistance in a parallel circuit.	
602	Demonstrate voltage in a parallel circuit.	
603	Demonstrate current flow in a parallel circuit.	
604	Apply Ohm's Law resistance for parallel circuit calculations.	
605	Calculate power in a parallel circuit.	

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606	Troubleshoot open circuit and short circuit conditions in a parallel circuit.	
700	SERIES-PARALLEL CIRCUITS	
701	Determine the total resistance in a Series-Parallel Circuit.	
702	Apply Kirchoff's current and voltage law to a Series-Parallel Circuit.	
703	Demonstrate a series-parallel circuit used as a voltage divider.	
800	BASIC NETWORK THEOREM	
801	Solve for the value of a load resistor.	
802	Calculate voltage and current for various load resistors.	
803	RESERVED	
804	RESERVED	
805	Calculate the value of load resistance for maximum power transfer.	
806	RESERVED	
900	ALTERNATING CURRENT	
901	Calculate the frequency of the waveform.	
902	Determine the average and RMS values of a sine-wave.	
903	Explain various waveforms.	
1000	OSCILLOSCOPE	
1001	Describe the basic sections of an oscilloscope.	
1002	Measure voltage using an oscilloscope.	
1003	Measure frequency using an oscilloscope.	
1004	Measure phase relationships using an oscilloscope.	
1100	INDUCTANCE	
1101	Measure and calculate the effect of a series resistive-inductive (RL) circuit on DC voltage and current.	
1102	Measure and calculate the effect of a series resistive-inductive (RL) circuit on AC voltage and current.	
1103	Calculate the total inductance of inductors connected in series or parallel.	
1200	INDUCTIVE REACTANCE	

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1201	Measure and calculate the effect of inductive reactance on current.	
1202	Measure and calculate the effect of change in frequency on current.	
1203	Demonstrate the phase (lead-lag) relationship between current and applied voltage in a series RL circuit.	
1204	Calculate the total inductive reactance in series and parallel circuits.	
1300	RESISTOR INDUCTOR (RL) CIRCUITS IN ALTERNATING CURRENT (AC)	
1301	Demonstrate the use of vectors to describe magnitude and direction of voltages.	
1302	Demonstrate the use of vectors in determining total current or voltage in series and parallel RL circuits.	
1400	TRANSFORMERS	
1401	Identify transformer windings and check for open and short circuits.	
1402	Calculate and measure voltage-turns ratio.	
1403	Measure the effect of secondary load on primary current.	
1500	CAPACITANCE	
1501	Demonstrate the effect of capacitance in AC and DC circuits.	
1502	Calculate total capacitance in series and parallel circuits.	
1503	Calculate and measure RC time constants.	
1600	CAPACITIVE REACTANCE	
1601	Measure and calculate the effect of capacitive reactance on current.	
1602	Measure and calculate the effect of change in frequency on circuit current.	
1603	Demonstrate the phase (lead-lag) relationship between current and applied voltage in a series RC circuit.	
1604	Calculate the total capacitive reactance in series and parallel circuits.	
1700	RESISTANCE CAPACITANCE (RC) CIRCUITS	
1701	Describe magnitude and direction of voltages using vectors.	
1702	Determining total current or voltage in series and parallel RC circuits using vectors.	
1703	Calculate Capacity/Rea -- (XC) in RC circuit.	
1800	RESISTANCE INDUCTANCE CAPACITANCE (RLC) CIRCUITS	
1801	Calculate total current in series RLC circuits.	
1802	Calculate total current in parallel RLC circuits.	

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1803	Calculate true power, apparent power and power factor in a RLC circuit.	
1804	Calculate (XC) and (XL) for RLC circuit.	
1900	RESONANCE	
1901	Calculate and measure the resonant frequency of a series RLC circuit.	
1902	Graph a response curve for a series resonant circuit, label Half-power points and bandwidth.	
1903	Calculate the "Q" of a series resonant circuit and demonstrate the effect it has on the response curve.	
1904	Calculate and measure the resonant frequency of a parallel RLC circuit.	
1905	Graph a response curve for a parallel resonant circuit, label half-power points and bandwidth.	
2000	SOLDERING	
2001	Demonstrate types and usage of a soldering iron.	
2002	Demonstrate the ability to desolder components from the circuit board.	
2003	Demonstrate the ability to solder components to the circuit board.	
2004	Demonstrate the proper and safe method for soldering and de-soldering terminals and components.	
2100	JUNCTION DIODES	
2101	Test a semiconductor diode and identify the cathode and anode leads using an ohmmeter.	
2102	Demonstrate the voltage-current relationship of a semiconductor diode by plotting the characteristic curve.	
2103	Demonstrate the correct bias for the operation of a LED.	
2104	Utilize a diode as a clipper or clamp.	
2200	POWER SUPPLIES	
2201	Identify common rectifier circuits (half-wave and full-wave).	
2202	Demonstrate the operation of a rectifier circuit.	
2203	Recognize various filter configurations and list their characteristics.	
2204	Calculate and measure DC output voltage for filtered and unfiltered power supplies.	
2205	Measure and calculate power supply ripple percentage and voltage regulation.	
2206	Calculate and measure the output voltage of a voltage multiplier.	
2207	Measure and plot the forward and reverse characteristics of a Zener diode.	
2208	Measure and demonstrate the regulation properties of a shunt type Zener regulator.	
2300	TRANSISTOR CHARACTERISTICS	

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2301	Identify base, emitter, and collector terminals of PNP and NPN transistors.	
2302	Locate the ratings, characteristics and operating parameters listed on a typical transistor specification sheet.	
2303	Determine the type of transistor, NPN or PNP, and operating condition, using an ohmmeter.	
2304	Identify schematic symbols and uses for various types of transistors.	
2305	Identify differences between FET and BJT devices.	
2400	SMALL SIGNAL AMPLIFIERS	
2401	Determine and demonstrate proper biasing polarity of NPN or PNP transistors in switching circuits.	
2402	Calculate decibel gain or loss.	
2403	Operate and measure the voltage gain of a common emitter audio amplifier.	
2404	Operate and measure the voltage gain of a common base amplifier.	
2405	Operate and measure the voltage gain of a common collector amplifier.	
2500	OPERATIONAL AMPLIFIERS	
2501	Operate and measure the phase shift between input and output of an inverting IC Op-Amp.	
2502	Operate and measure the phase shift between input and output of a non-inverting IC Op-Amp.	
2600	BASIC DIGITAL ELECTRONICS	
2601	Convert decimal numbers to the binary number system and binary to decimal.	
2602	Convert binary numbers to hexadecimal number system and hexadecimal to binary.	
2603	Demonstrate the operation and the truth tables for the seven basic logic gates.	
2604	Connect and demonstrate combinational logic.	
2605	Describe Boolean reduction and Karnaugh mapping.	
2700	NANOTECHNOLOGY	
2701	Define nanotechnology.	
2702	Explain nanotechnology measurements.	
2800	TROUBLESHOOTING	
2801	Solve simple problems using basic inquiry methods and strategies.	
2802	Demonstrate knowledge of troubleshooting procedures that are used for detecting failures in electrical and electronic circuits.	
2900	ELECTRONIC COMMUNICATIONS	

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2901	Identify and explain the major components of a basic communication system.	
2902	RESERVED	
3000	MOTORS	
3001	Describe the characteristics of AC and DC motors.	
3002	Describe characteristics of induction and Stepper motors.	
3003	Explain the difference between brushed and brushless motors.	
3004	Explain the use and function of a servomechanism to control the performance of a device.	
3005	Demonstrate knowledge of motor controllers and speed controllers.	
3100	HISTORY OF ELECTRONICS	
3101	Describe the history of electricity.	
3102	Describe the history of the vacuum tube and transistor.	
3103	Describe the history of the integrated circuit.	