Crawford County Career & Technical Center

Competency Task List – Secondary Component

Electrical, Electronic and Communications Engineering Technology/Technician CIP 15.0303

High School Graduation Years 2025, 2026, 2027

100 Safety

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
101	Follow OSHA safety regulations.		
102	Identify, select, and demonstrate hand tool use for electronics work.		
103	Recognize the types and usages of fire extinguishers.		
104	Interpret Safety Data Sheets (SDS).		
	RESERVED (105)		
106	Explain the chemical and environmental hazards for disposal of electronics equipment.		
107	Describe electrical shock and list the effects of electric current on the human body.		

200 Electrical Quantities and Components

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
201	Describe electronic measurements and their applications.		
202	Identify the fundamental SI units.		
203	Apply scientific and engineering notation.		

	RESERVED (204)		
205	Identify resistor values by color code and numerical markings.		
206	Identify schematic symbols used in electronic schematic diagrams.		
207	Identify component markings for various types of electrical and electronic components.		
	RESERVED (208)		

300 Instrumentation

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
301	Utilize multimeters, function generators, and frequency counters.		
	RESERVED (302-303)		
304	Utilize a variable output power supply.		

400 Ohm’s Law/Power

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
401	Apply the concept of Ohm's law to determine current, voltage, or resistance.		
402	Identify the relationship between voltage, current, resistance, and power in DC using the 12 basic common formulas derived from Ohm's law and Watt's pie chart.		
	RESERVED (403-405)		

500 Series Circuits

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
501	Apply Kirchhoff's voltage law in a series circuit.		
	RESERVED (502-503)		
504	Design/build a series circuit and solve for its equivalent resistance.		

505	Analyze power consumption, dissipation, and energy units in a series circuit.		
506	Analyze the effects of open circuits and short circuits in series circuits.		

600 Parallel Circuits

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
601	Design/build a parallel circuit and solve for its equivalent resistance.		
602	Explain voltage in a parallel circuit.		
603	Apply Kirchhoff's current law in a parallel circuit.		
	RESERVED (604)		
605	Analyze power consumption, dissipation, and energy units in a parallel circuit.		
606	Analyze the effects of open circuit and short circuit conditions in parallel circuits.		

700 Series-Parallel Circuits

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
701	Design/build a series-parallel combination circuit and solve for its equivalent resistance.		
702	Apply Kirchhoff's current and voltage law to a series-parallel circuit.		
703	Analyze and troubleshoot DC combination/complex circuits.		
704	Use network theorems to analyze series-parallel circuits.		
705	Measure and calculate maximum power transfer.		

800 Reserved

900 Alternating Current

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
901	Calculate the period and frequency of the waveform.		
902	Determine the peak-to-peak, average and RMS values of a sine wave.		
903	Identify various waveforms (sine wave, square wave, triangle wave, sawtooth wave).		

1000 Oscilloscope

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
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

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1101	Calculate the value of the inductor based on physical properties.		
	RESERVED (1102)		
1103	Calculate and measure the total inductance of inductors connected in series or parallel circuits.		
1104	Calculate and measure RL time constant.		

1200 Inductive Reactance

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1201	Measure and calculate the effect of inductive reactance on current.		
1202	Measure and calculate the effect of change in frequency on current.		
1203	Identify 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 (R~~ł~~L) Circuits in Alternating Current (AC)

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1301	Use vectors to describe magnitude and direction of voltages.		
1302	Use vectors in determining total current or voltage in series and parallel RL circuits.		
1303	Measure and calculate the effect of a series resistive-inductive (R~~ł~~L) circuit on AC voltage and current.		

1400 Transformers

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1401	Identify transformer windings, types, and usages.		
1402	Calculate and measure voltage-turns ratio.		
1403	Measure the effect of secondary load on primary current.		
1404	Troubleshoot transformers for open and short circuit conditions.		

1500 Capacitance

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1501	Identify the effect of capacitance in AC and DC circuits.		
1502	Calculate and measure for equivalent capacitance in series and parallel circuits.		
1503	Calculate and measure RC time constants.		

1600 Capacitive Reactance

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
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	Identify 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

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1701	Describe magnitude and direction of voltages using vectors.		
1702	Determining total current or voltage in series and parallel RC circuits using vectors.		
	RESERVED (1703)		
1704	Measure and calculate the effect of a series capacitive-resistive circuit on AC voltage and current.		

1800 Resistance Inductance Capacitance (RLC) Circuits

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1801	Analyze and construct series RLC circuits.		
1802	Analyze and construct parallel RLC circuits.		
	RESERVED (1803-1804)		

1900 Resonance

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
1901	Calculate and measure the resonant frequency of a series RLC circuit.		
	RESERVED (1902)		
1903	Calculate the Q of a series resonant circuit.		
1904	Calculate and measure the resonant frequency of a parallel RLC circuit.		
	RESERVED (1905)		
1906	Graph a response curve on a series RLC circuit.		
1907	Graph a response curve on a parallel RLC circuit.		

2000 Soldering/Desoldering

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2001	Demonstrate types and usage of soldering/desoldering equipment.		
2002	Desolder components from a circuit board.		
2003	Solder components to a circuit board.		
2004	Demonstrate soldering and de-soldering surface mount device (SMD) methods.		

2100 Diodes

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2101	Test diodes and identify the cathode and anode.		
2102	Analyze the voltage-current relationship of diodes by plotting the characteristic curve.		
2103	Distinguish the correct bias for the operation of a LED.		
2104	Compare the forward and reverse characteristics of a Zener diode.		

2200 Power Supplies

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2201	Identify common rectifier circuits (half-wave and full-wave).		
2202	Construct and analyze the operation of a rectifier circuit.		
2203	Investigate the cause and effect of power supply filtering, hum, and common filter types.		
	RESERVED (2204)		
2205	Measure and calculate power supply ripple percentage and voltage regulation.		
	RESERVED (2206-2207)		
2208	Measure and identify the regulation properties of a shunt-type Zener regulator.		
2209	Select switch mode power supply for different applications.		

2300 Transistor Characteristics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
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/data sheet.		
2303	Determine the type of transistor, PNP or NPN, and operating condition.		
2304	Identify schematic symbols and uses for various types of transistors.		
2305	Compare FET and BJT devices.		

2400 Small Signal Amplifiers

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2401	Use biasing polarity of NPN or PNP transistors.		
2402	Calculate and measure gain.		
2403	Distinguish between basic amplifier configurations.		
	RESERVED (2404-2405)		

2500 Operational Amplifiers

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2501	Construct and analyze the phase shift between input and output of an inverting IC Op-Amp.		
2502	Construct and analyze the phase shift between input and output of a non-inverting IC Op-Amp.		

2600 Basic Digital Electronics

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2601	Convert between numbering systems (decimal, binary, octal and hexadecimal).		
	RESERVED (2602)		

2603	Identify the operation and develop the truth tables for the seven basic logic gates.		
2604	Connect combinational logic (multiplexer, demultiplexer, half-adder, full-adder).		
2605	Apply Boolean reduction and construct Karnaugh mapping for complex logic circuits.		

2700 Reserved

2800 Troubleshooting

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2801	Utilize the order of the troubleshooting process to detect failures in electrical and electronic circuits.		
2802	Analyze and troubleshoot failures in electrical and electronic circuits.		

2900 Electronic Communications

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
2901	Identify and explain the major components of a basic communication system.		
	RESERVED (2902)		
2903	Measure and calculate maximum power transfer.		

3000 Motors

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
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.		
3005	Explain and use motor controllers and speed controllers.		

3100 History of Electronics – Past, Present, and Future

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
3101	Examine the cause and effect of past, present, and future technologies.		
	RESERVED (3102-3103)		

3200 Microcontrollers

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
3201	Program and use a microcontroller to read an input and control an output (digital, analog, PWM, and display).		

3300 Electromagnetism

Item	Task	(X) Indicates Proficiency [1]	Secondary Course Crosswalk
3301	Construct an electromagnet.		
3302	Design/build a relay control circuit.		
3303	Differentiate between electromagnetic and solid-state relays.		

[1] Student Demonstrated Entry-Level Industry Proficiency as Indicated by (X)

Secondary CTE Instructor Signature _____ Date _____

Student Signature _____ Date _____