

Alabama CTE Equipment List

This list is based on a classroom size of 25 students and meets minimum standards. All costs are estimated. No specific equipment vendor or brand names are endorsed, but school districts should consult with stakeholders to ensure industry-recognized equipment and software are purchased. The intent of this list is to provide school districts with guidance on the equipment needed to cover the state standards for an Industrial Maintenance Electrical and Instrumentation program and are not meant to dictate the number of students that can safely fit in a classroom and/or laboratory.

Cluster: Manufacturing

Program: Industrial Maintenance Electrical and Instrumentation

CLASSROOM EQUIPMENT

TOTAL: \$11,375

QUANTITY	ITEM DESCRIPTION	UNIT	TOTAL
5	Computer/Device with Current Operating System	\$1,000	\$5,000
1	Copy Machine, own or have accessibility to use	\$500	\$500
3	File Cabinets	\$100	\$300
3	File Sets	\$25	\$75
1	Industry related (simulation) software package	\$2,500	\$2,500
1	Laser Printer, color	\$500	\$500
1	Technology- LCD projector or TV/Computer connection and/or overhead projector with video streaming capability	\$2,500	\$2,500

PROGRAM EQUIPMENT (Items over \$250)

TOTAL: \$70,320

QUANTITY	ITEM DESCRIPTION	UNIT	TOTAL
1	AC Generator	\$1,000	\$1,000
1	Aluminum Conductor	\$500	\$500
1	Analog Differential Pressure Transmitter (Rosemount 1151DP Alphaline or Similar Model)	\$350	\$350
1	Analog Temperature Calibrator (Fluke Model 724 or Similar Equipment)	\$3,200	\$3,200
1	Assorted NEMA and IEC Magnetic and Manual Contractors and Motor Starters Kit	\$500	\$500
1	Assorted Sizes of Wire/Cables and Connectors	\$500	\$500
1	Bandsaw	\$1,500	\$1,500
1	Bellows-type Pressure Sensors	\$350	\$350
1	Bench-mounted Tube Bender	\$500	\$500
1	Bourdon Tube	\$300	\$300
1	Bubble Leak Tester	\$500	\$500
1	Bubbler System	\$1,000	\$1,000
1	Buck-and-Boost Transformers	\$1,000	\$1,000
1	Bulkhead for Fitting	\$650	\$650
1	Calibration Meter	\$400	\$400

1	Capacitance Device	\$300	\$300
1	Contractor/Motor Starter Accessories (Including Power-pole Adder Kit, Timer Attachment, Fuse Kit, Transient Suppression Module, Internal Auxiliary Contacts, Control Transformers, Pushbutton Switches, Push-pull Pushbutton Switches, Selector Switches, Pilot Lights, Assorted Pushbutton Stations, Temperature Switches, Pressure Switches, Mechanical Limit Switches, Flow Switches, Float Switches, Foot Switches, Jogging and Plugging Switches, Inductive and Capacitive Proximity Sensors, Photoelectric Switches/Sensors, Drum Switches, Assorted NEMA Enclosures, 240v Moto, and Tools Necessary for Making Wiring Connections)	\$1,000	\$1,000
1	Control Devices (Including Sensors, Controllers, and Actuators) for Assembly and Disassembly	\$500	\$500
1	Coriolis Meter	\$2,500	\$2,500
1	Displacer	\$1,000	\$1,000
1	Documenting Process Calibrator	\$1,000	\$1,000
1	Electric Load Cell	\$1,000	\$1,000
1	Electromagnet Flowmeter	\$1,500	\$1,500
1	Electronic Transmitter	\$300	\$300
1	Explosion Proof Fittings Kit (Explosion Proof Elbows including 1-1/2" Hubs, 1-1/4" Hubs, 2" Hubs, 2-1/2" Hubs, and 3" Hubs with 90-Degrees Bend)	\$1,000	\$3,000
1	Fire Extinguisher (ABCK)	\$270	\$270
1	Fluid Thermometer	\$600	\$600
1	Fluke 789 Process Meter	\$1,200	\$1,200
1	Grounding Clamp Kit	\$500	\$500
1	Hand Bender (with Manufacturer Instructions)	\$400	\$400
1	Hand Crimping Tool/Dye	\$400	\$400
1	Handheld HART Communicator	\$500	\$500
1	Hydraulic Component Kit (Including Filters, Strainers, Regulators, Pumps, Accumulators, Hoses, Fittings and Quick Disconnects, Control Valves, Cylinders, and Motors)	\$1,000	\$1,000
1	Hydraulic Crimping Tool/Dye	\$1,000	\$1,000
1	Hydraulic Flaring Tool	\$300	\$300
1	Hydraulic Tube Bender	\$500	\$500
1	Insulating Cover Kit	\$400	\$400
1	Insulating Mat Kit	\$1,000	\$1,000
1	Magnetic Overload Relays Kit	\$600	\$600
1	Malfunction Loop Calibrator (Fluke Model 725 or Similar Equipment)	\$3,800	\$3,800
1	Malfunction Process Calibrator	\$800	\$800
1	Megohmmeter	\$250	\$250
1	Molded Case Circuit Breaker	\$250	\$250

1	Manufacturer's Gain Table	\$500	\$500
1	Melting-alloy Thermal Overload Relays Kit	\$500	\$500
1	Metal Clad Cable	\$200	\$200
1	Miniature Electromechanical Plug-in Relays Kit	\$1,000	\$1,000
1	Ohmmeter	\$1,000	\$1,000
1	Open-frame Electromechanical Power Relays Kit	\$1,000	\$1,000
1	Open-loop Ammeter	\$300	\$300
1	Oscilloscope	\$2,000	\$2,000
1	Pipe Cutters	\$250	\$250
1	Pipe Cutting Knife	\$250	\$250
2	Pipe Rack	\$350	\$700
1	Pitot Tube	\$400	\$400
1	Plug Kit for Fittings	\$350	\$350
1	Pneumatic Calibrator (Example includes WallyBox)	\$500	\$500
1	Pneumatic Component Kit (Including HART, Filters, Regulators, Hoses, Fittings and Quick Disconnects, Control Valves, Cylinders, and Motor)	\$1,000	\$1,000
1	Pneumatic Temperature Transmitter	\$250	\$250
1	Pneumatic Transmitter	\$500	\$500
1	Portable Air Tank	\$250	\$250
1	Portable Conduit Threader Kit	\$2,500	\$2,500
1	Portable Ground Tester	\$700	\$700
1	Portable Mechanical Conduit Bender	\$2,000	\$2,000
1	Process Control Test Meter	\$500	\$500
1	Pyrometer	\$600	\$600
1	Ratchet Cable Bender	\$1,000	\$1,000
1	Resistance Temperature Detectors	\$300	\$300
1	Rotameter	\$300	\$300
1	Samples of Valves (with Rising, Non-rising, and OS&Y Stems)	\$1,000	\$1,000
1	Selection of Printed Circuit Boards, Sealed Components, Integrated Circuits, and Microprocessors Kit	\$1,000	\$1,000
1	Selection of Schematic and Logic Diagrams (Software)	\$1,000	\$1,000
1	Solenoid Valve	\$300	\$300
1	Spring Tube Bender	\$500	\$500
1	Target Flowmeter	\$800	\$800
1	Tee Fitting	\$250	\$250
1	Telescoping Hot Stick and Attachments	\$250	\$250
1	Test Circuit	\$500	\$500
1	Thermistor	\$1,000	\$1,000
1	Torque Wrench Set	\$500	\$500
1	Transfer Switch	\$400	\$400
1	Tubing (Various: Copper, Steel, Stainless Steel, Aluminum, Monel, Inconel, Hastelloy, Poly, and PVC)	\$500	\$500
1	Type MC Cable Connectors	\$500	\$500
1	Ultrasonic Level Measurement System	\$1,000	\$1,000

1	Various Types of Sealing Fittings Used in Hazardous Locations including those with Drains (1-1/2"-4")	\$2,000	\$2,000
1	Various Types of Specialty Transformers	\$500	\$500
1	Voltmeter	\$750	\$750
1	Vortex Flowmeter	\$600	\$600

INSTRUCTIONAL SUPPLIES (Items under \$250)

TOTAL: \$19,652

QUANTITY	ITEM DESCRIPTION	UNIT	TOTAL
1	#10 and #12 Solid Wire	\$100	\$100
24	Calculators	\$10	\$240
1	10" Sample Obstruction Kit	\$100	\$100
1	24v Transformer (with a Plug Power Cord)	\$40	\$40
1	Access to an Operational Process System with Sensors (Flow, Pressure, Level, and/or temperature), Applicable Actuators and Positioners, and some kind of Controller) for Electric and Pneumatic Sensors	Market Price	Market Price
1	Ammeter	\$100	\$100
1	Assorted Manufacturer's Motor Control Device Catalogs/Data Sheets	\$100	\$100
1	Assorted Sizes and Types of Crimp Connectors	\$20	\$20
1	Assorted Sizes and Types of Mechanical Compression Connectors	\$200	\$200
1	Assorted Sizes and Types of Wire Nuts	\$100	\$100
1	Assorted Wire and Connectors for Making Control Circuit Wiring Connections Kit	\$200	\$200
6	Back Support Belt	\$40	\$240
1	Belt Tension Gauge (10 lbs.)	\$15	\$15
1	Bending Charts to Match Mechanical, Electrical, and Hydraulic Benders	Market Price	Market Price
1	Bi-metal Thermometer	\$100	\$100
1	Bi-metallic Overload Relays Kit	\$100	\$100
5	Brooms	\$10	\$50
1	Butt-welded Fitting	\$100	\$100
1	Cable Connector Kit (RJ45 Jacks and Plugs and Coaxial Cable Connectors)	\$50	\$50
1	Cable Kit (Various: NM, NMC, UF, NMS, MV, MC, AC, FC, FCC, TC, SE, and USE)	\$200	\$200
1	Capacitor	\$100	\$100
1	Clamp-on Ammeter	\$100	\$100
1	Cleaning/Chemical Cabinet (Lockable)	\$250	\$250
1	Coaxial Cable Compression Tool	\$180	\$180
1	Coaxial Cable Stripping Tool	\$30	\$30
1	Color-coded Wire (4-rolls/14 gauge)	\$40	\$40
1	Components and Wire to Connect Basic Test Circuits	\$150	\$150

1	Compression Fitting	\$30	\$30
1	Compression Fittings Kit	\$200	\$200
1	Conductance Device	\$100	\$100
1	Conduit (Various: Aluminum, Electrical Metallic, Galvanized, and Flexible)	Market Price	Market Price
1	Conduit Bending Protractor	\$100	\$100
1	Conduit Leveling Tools	\$100	\$100
1	Copper Conductor	\$100	\$100
1	Copy of NFPA 708, <i>Recommended Practice for Electrical Equipment Maintenance</i>	\$160	\$160
1	Copy of the Latest Edition of the <i>National Electrical Code</i>	\$200	\$200
1	Coupling	\$200	\$200
1	Cross-linked Polyethylene Insulation	\$100	\$100
1	Cross-tubing Cap	\$60	\$60
1	Cutting Oil (5 gal.)	\$220	\$220
1	DC Load Resistance	\$200	\$200
1	Dipstick and Lead Line	\$40	\$40
1	Drip Pan	\$10	\$100
2	Dust Pans	\$20	\$40
10	Earmuffs	\$20	\$200
1	Elbow Fitting	\$60	\$60
1	Elbows Sample	\$100	\$100
1	EMT Bending Tool Kit	\$200	\$200
1	End Plug for PVC Conduit	\$50	\$50
1	Example of Logic Diagrams	N/A	N/A
1	Example of Swamping Box Arrangement	Market Price	Market Price
1	Examples of Automatic Valve Actuators (Including Electrical, Hydraulic, and Pneumatic)	\$100	\$100
1	Examples of Circuit Schedules/Wire List (Including Electrical Outlet, Electrical Switch,	N/A	N/A
1	Examples of Control Ladder Diagrams	N/A	N/A
1	Examples of Network Cables (USB, Twister Pair, Coaxial, Optical Fiber, and IEE 1394)	Market Price	Market Price
1	Examples of Photographs of RTDs	Market Price	Market Price
1	Examples of Wired Thermocouples and Multiple Element Thermocouples	Market Price	Market Price
1	Examples of Wiring Diagrams Kit (Including Wire Alternator, Wire, Wires Circuit, Starter Wiring, Stage Wiring, Doorbell Wiring, Wiring Ceiling Fan, etc.)	\$100	\$100
1	Extension Ladder	\$250	\$250
3	Eye Protection (Pack of 12-OSHA Standard)	\$15	\$45
2	Eye Rinse Stations	\$115	\$230
1	Female Adaptor/Connector for Fittings	\$150	\$150

1	Filter Capacitor	\$200	\$200
1 per room	First Aid Kit	\$20	\$20
1	Fish Tape (50 ft.)	\$210	\$210
1	Flanges and Flange Bolts Kit	\$200	\$200
1	Flare Fitting	\$60	\$60
1	Flaring Tools Kit	\$100	\$100
1	Flare Nut Wrench	\$40	\$40
2	Flashlight	\$10	\$20
1	Float and Cable Arrangements	\$150	\$150
2	Floor Squeegee	\$20	\$40
1	Flow Nozzle	\$250	\$250
2	Garbage Can (with Casters)	\$75	\$150
1	Gauge Glasses	\$35	\$35
As needed	Gloves (Disposable)	\$15	\$15
1	Grounding Cable Kit	\$250	\$250
1	Grounding Strap	\$25	\$25
1	Hacksaw	\$35	\$35
1	Hand Bender	\$70	\$70
1	Handheld/Internal Cutter	\$20	\$20
1	Hand-operated Threader	\$60	\$60
10	Hard Hat	\$50	\$500
10	Hard Hat Mount Earmuff (21-decibels)	\$40	\$400
1	Heat Sink Insulator Kit	\$20	\$20
1	Heat-shrink and Roll-on Insulation Tape	\$100	\$100
30	Heavy Duty Work Gloves (S-M-L)	\$20	\$600
1	Hickey	\$60	\$60
1	Hydraulic Pressure Regulator	\$200	\$200
1	Hydraulic System with Actuators	\$150	\$150
1	Hydrostatic Head Device	\$250	\$250
1	I/O Module Kit	\$200	\$200
1	IC Removal and Insertion Tools Kit	\$100	\$100
5	Insulated Electrician Jacket	\$50	\$250
1	Kicks Sample	\$200	\$200
1	Lengths of ¾" Rigid, EMT, and IMC Conduit	Market Price	Market Price
1	Lengths of 1" Rigid, EMT, and IMC Conduit	Market Price	Market Price
1	Lengths of 2" Rigid, EMT, and IMC Conduit	Market Price	Market Price
1	Lengths of 8" Pipe	Market Price	Market Price
1	Lengths of PVC Conduit	Market Price	Market Price
1	Limit Switch	\$100	\$100
1	Liquid Bubble Test Fluid	\$10	\$10
1	Magnetic Float Device	\$160	\$160

1	Magnetic Torpedo Level	\$20	\$20
1	Male Adaptor/Connector for Fittings	\$150	\$150
1	Manometer	\$120	\$120
1	Manual Flaring Tool	\$200	\$200
2	Mop	\$20	\$40
2	Mop Bucket	\$50	\$100
1	Motor Rotation Tester	\$200	\$200
1	Multimeter	\$200	\$200
1	Number 12 THNN Conductors Kit (500 ft.)	\$170	\$170
1	Nylon Insulation	\$100	\$100
1	Offsets Sample	\$100	\$100
1	Orifice Plate	\$50	\$50
24	<i>OSHA Electrical Safety Guidelines (Pocket Edition)</i>	\$10	\$240
1	Outside or Inside Vernier Caliper	\$80	\$80
1	Phase Rotation Tester	\$200	\$200
1	Pipe Vise	\$200	\$200
1	Pneumatic DP Transmitter	\$200	\$200
1	Pneumatic Pressure Regulator	\$25	\$25
1	Pneumatic Solenoid Valve	\$15	\$15
1	Pneumatic System with Actuators	\$200	\$200
1	Polyethylene Insulation	\$200	\$200
1	Polyvinyl Chloride Insulation	\$150	\$150
1	Power Cable Stripper	\$100	\$100
1	Pressure Element Protection (Various: Insolation Diaphragms and Snubbers)	\$200	\$400
1	Prism	\$140	\$140
1	Process Control Equipment (PCE)	Market Price	Market Price
1	Propane Torch	\$100	\$100
3	Protective Facial Shield	\$25	\$250
24	Protractors	\$10	\$240
1	Pushbutton	\$100	\$100
1	PVC Cement (1 gal.)	\$30	\$30
1	PVC Heater	\$100	\$100
As Needed	PVC Pieces	Market Price	Market Price
1	Ratchet Shears	\$200	\$200
1	Reamer	\$100	\$100
1	Reducer for Fittings	\$100	\$100
1	Rodder	\$130	\$130
10	Rule	\$10	\$100
1	Saddle Sample	\$100	\$100
1	Sample One-line Diagrams, Electrical Raceway Drawings, P&IDs, Loop Sheets, and Electronic Schematic Diagrams Kit	\$100	\$100
1	Samples of Different Types of Valve Packing	\$100	\$100

1	Samples of Hydraulic Fluids with Matching MSDSs	Market Price	Market Price
1	Samples of Simple and Complex Hydraulic System Drawings	Market Price	Market Price
1	Samples of Simple and Complex Pneumatic System Drawings	Market Price	Market Price
1	Sandpaper	\$50	\$50
1	Scientific Calculator	\$50	\$50
1	Seal-off Fittings, Packing Fiber, and Sealing Compound Kit	\$200	\$200
1	Selection of Diodes, LEDs, Transistors, and SCRs	\$200	\$200
1	Shield Drain	\$14	\$14
1	Shield for Instrumentation Control Wiring (10 ft.)	\$20	\$20
1	Shop Towels (2400 Sheets)	\$100	\$100
1	Short Conduit Nipples Kit	\$200	\$200
1	Socket-welded Fitting	\$20	\$20
1	Soft Tubing Cutters	\$150	\$150
24	Straight-edge Ruler	\$2	\$48
1	Tape Measurer (25 ft.)	\$25	\$25
1	Teflon Insulation	\$200	\$200
1	Thermocouple	\$130	\$130
1	Thermocouple for Fitting	\$150	\$150
1	Tool Kit for Hydraulic System	\$110	\$110
1	Tool Kit for Pneumatic System	\$100	\$100
1	Torpedo Level	\$20	\$20
1	Turbine Flowmeter	\$220	\$220
100	Uncorded Ear Plugs (OSHA Standard)	\$15	\$15
1	Union Fitting	\$120	\$120
1	Valve Lap Toolkit	\$100	\$100
1	Various Pipe Hangers and Supports Kit	\$200	\$200
1	Various Solid, Stranded, and Compact Conductors	Market Price	Market Price
1	Venturi Tube	\$150	\$150
1	Volt-Ohm Milliammeter	\$50	\$50
1	Wire Grip	\$30	\$30
1	Wire Stripper	\$30	\$30
1	Wire-wound and Carbon Composition Electronic Resistors	\$10	\$10

OPTIONAL EQUIPMENT/SUPPLIES

ITEM DESCRIPTION
Programmable Logic Controller (PLC) Trainer

Category Totals:

Classroom Equipment	\$11,375
Program Equipment	\$70,320
Instructional Supplies	\$19,652
Estimated Program Total	\$101,347