Texas CTE

AC/DC Electronics

Knowledge and skills. ACDCELEC

1 The student demonstrates the skills necessary for success in a technical career. The student is expected to: ACDCELEC.1

- A identify training, education, employment, and career opportunities, including differences between an electronic technician, electronic technologist, and electrical engineer; ACDCELEC.1A
- B investigate and work toward industry certifications; ACDCELEC.1B
- C discuss ethical issues related to electronics; ACDCELEC.1C
- D identify and demonstrate respect for diversity in the workplace; ACDCELEC.1D
- E identify and demonstrate appropriate actions and consequences relating to discrimination, harassment, and inequality; ACDCELEC.1E
- F explore career preparation learning experiences, including job shadowing, mentoring, and apprenticeship training; and ACDCELEC.1F
- G discuss Accreditation Board for Engineering and Technology (ABET) accreditation and implications. ACDCELEC.1G

2 The student participates in team projects in various roles. The student is expected to: ACDCELEC.2

- A explain the importance of teamwork in the field of electronics; ACDCELEC.2A
- B apply principles of effective teamwork and problem solving, including collaboration and conflict resolution; and ACDCELEC.2B
- C demonstrate proper attitudes as a team leader and team member. ACDCELEC.2C

3 The student develops skills for managing a project. The student is expected to: ACDCELEC.3

- A implement project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing a project; ACDCELEC.3A
- B develop a project schedule and complete work according to established criteria; ACDCELEC.3B
- C participate in the organization and operation of a real or simulated engineering project; and ACDCELEC.3C
- D develop a plan for production of an individual product. ACDCELEC.3D

'he student practices safe and proper work habits. The student is expected o: ACDCELEC.4

- A master relevant safety tests; ACDCELEC.4A

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B comply with safety guidelines as described in various manuals, instructions, and regulations; ACDCELEC.4B

C identify governmental and organizational regulations for health and safety in the workplace related to electronics; ACDCELEC.4C

D identify and classify hazardous materials according to Occupational Safety and Health Administration (OSHA) regulations and industry standards; ACDCELEC.4D

E dispose of hazardous materials appropriately; ACDCELEC.4E

F perform maintenance on selected tools, equipment, and machines; ACDCELEC.4F

G handle and store tools and materials correctly; and ACDCELEC.4G

H describe the results of improper maintenance of material, tools, and equipment. ACDCELEC.4H

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5 The student develops an understanding of basic direct current (DC) electricity principles. The student is expected to: ACDCELEC.5

A describe DC and give examples of its application and generation; ACDCELEC.5A

B demonstrate an understanding of atomic theory and the relationship between atomic number and a material's conductivity and insulation characteristics; ACDCELEC.5B

C identify and apply the proper use of electronic schematics and symbols, including switches, voltage, current, ground, resistors, fuses, circuit breakers, volt meters, and amp meters; ACDCELEC.5C

D define and describe switches, voltage source, current source, ground, resistors, fuses, circuit breakers, volt meters, amp meters, voltage, current, and resistance; ACDCELEC.5D

E identify the resistance value from the resistor color code; ACDCELEC.5E

F express Ohm's Law in three forms with appropriate symbols and units; ACDCELEC.5F

G express the Power Law in three forms with appropriate symbols and units; ACDCELEC.5G

H describe series, parallel, and combination circuits; ACDCELEC.5H

I apply Ohm's Law to calculate current, voltage drops, and resistance for each component in a multi-component series, parallel, and combination circuit; ACDCELEC.5I

J apply the Power Law to calculate current, voltage drops, resistance, and power for each component in a multi-component series, parallel, and combination circuit; and ACDCELEC.5J

K express current and resistance values in both scientific notation and engineering notation. ACDCELEC.5K

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The student develops an understanding of basic alternating current (AC) electricity principles. The student is expected to: ACDCELEC.6

A describe AC and give examples of its application and generation; ACDCELEC.6A

B calculate peak, peak-to-peak, average, and root mean square (RMS) voltage; ACDCELEC.6B

C explain the relationship between mechanical load and current in a generator; ACDCELEC.6C

D identify the purpose and application of a transformer; ACDCELEC.6D

E identify voltage and current values relative to a turns ratio in a transformer; ACDCELEC.6E

F describe and calculate capacitance and capacitive reactance; and ACDCELEC.6F

G describe and calculate inductance and inductive reactance. ACDCELEC.6G

7 The student implements the concepts and skills that form the technical knowledge of electronics using project-based assessments. The student is expected to: ACDCELEC.7

A apply Ohm's law, Kirchhoff's laws, and power laws to actual or simulated circuits; ACDCELEC.7A

B build series, parallel, and combination circuits; ACDCELEC.7B

C demonstrate an understanding of magnetism and induction as they relate to electronic circuits; ACDCELEC.7C

D perform electrical-electronic troubleshooting assignments; ACDCELEC.7D

E identify actual electronic components, including resistors, capacitors, switches, fuses, power sources, and inductors; ACDCELEC.7E

F explain how torque is produced in a motor; and ACDCELEC.7F

G explain where counter electromotive force (CEMF) comes from in a motor. ACDCELEC.7G

8 The student applies the concepts and skills to simulated and actual work situations. The student is expected to: ACDCELEC.8

A measure and calculate resistance, current, voltage, and power in series, parallel, and complex circuits; ACDCELEC.8A

B apply electrical theory to generators, electric motors, and transformers; and ACDCELEC.8B

C design analog circuits using common components. ACDCELEC.8C

9 The student learns the function and application of the tools, equipment, and materials used in electronics through project-based assignments. The student is expected to: ACDCELEC.9

A use tools and laboratory equipment in a safe manner to construct and repair circuits; ACDCELEC.9A

B use precision measuring instruments to analyze circuits and prototypes; ACDCELEC.9B

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C demonstrate an understanding of the difference between current and voltage measurement; ACDCELEC.9C

D use a multimeter to perform resistance, voltage, and current measurements; ACDCELEC.9D

E describe and perform measurements, including period and amplitude, using an oscilloscope; ACDCELEC.9E

F use multiple software applications to simulate circuit behavior and present concepts; and ACDCELEC.9F

G use a project notebook to record measured values, lab observations and results, circuit operational requirements, and circuit design and modifications. ACDCELEC.9G

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10 The student designs a circuit using appropriate design processes and techniques. The student is expected to: ACDCELEC.10

A interpret industry standard circuit schematics; ACDCELEC.10A

B identify areas where quality, reliability, and safety can be designed into a circuit; ACDCELEC.10B

C improve a circuit design to meet a specified need; ACDCELEC.10C

D sketch schematics; and ACDCELEC.10D

E explore new technologies that may affect electronics. ACDCELEC.10E

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11 The student builds a prototype circuit using the appropriate tools, materials, and techniques. The student is expected to: ACDCELEC.11

A identify and describe the steps needed to produce a prototype; ACDCELEC.11A

B identify and use appropriate tools, equipment, machines, and materials to produce the prototype; and ACDCELEC.11B

C present a final project using a variety of media. ACDCELEC.11C