STRANDS AND STANDARDS
ELECTRICIAN 2

Learning that works for Utah
CTE®

Course Description

In Electrician 2, students delve deeper into electrical theory and its practical applications. They explore how devices and electrical systems function, gain familiarity with the National Electrical Code (NEC), and apply their knowledge to complete electrical installation projects using blueprints and schematics. Additionally, the course emphasizes electrical safety practices.

Intended Grade Level	10-12
Units of Credit	0.5
Core Code	40.08.00.00.055
Concurrent Enrollment Core Code	N/A
Prerequisite	Electrician 1
Skill Certification Test Number	N/A
Test Weight	N/A
License Area of Concentration	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Electrical
Endorsement 2	N/A
Endorsement 3	N/A

STRAND 1: SAFETY

Students will practice electrical safety.

Standard 1

Demonstrate safe working procedures in a construction environment.

- Introduction to NFPA 70E

Standard 2

Explain the purpose of OSHA and how it promotes safety on the job.

Performance Skills

- Pass relevant safety tests with 100 percent.
- Use concepts and practices to solve, mitigate, and manage potential electrical hazards.
  - Personal protective equipment.
  - Lockout/tagout procedures.

STRAND 2: NATIONAL ELECTRICAL CODE (NEC).

Students will investigate the National Electrical Code.

Standard 1

Review NEC definitions.

- Article 100: Definitions
  - Nuance of language used (i.e. “shall” vs. “may,” “outlet” vs. “receptacle,” etc.)

Standard 2

Explore chapter 3 of the NEC.

- Article 300: Wiring Methods
- Article 310: Conductors
- Article 320: AC Cable
- Article 330: MC Cable
- Article 334: NM Table
- Article 338: SC Cable
- Article 344: Rigid Metal Conduit
- Article 358: Electrical Metallic Tubing
- Article 362: Electrical Non-Metallic Tubing

Standard 3

Explore Chapter 4 of the NEC.

- Article 404: Switches
- Article 406: Receptacles
- Article 408: Panel Boards
- Article 410: Luminaires
- Article 411: Low Voltage Lighting
- Article 422: Appliances
- Article 424: Fixed Electrical Space Heating
- Article 430: Motors, Motor Circuits, & Controllers
- Article 440: Air Conditioning & Refrigeration Equipment
- Article 445: Generators
- Article 450: Transformers

Performance Skills

- Reference the NEC as it applies to electrical installations.
- Complete an electrical installation of a simulated residential building (i.e. SkillsUSA competition).

STRAND 3: PLANS & SCHEMATICS

Students will interpret electrical plans or schematics to construct electrical circuits.

Standard 1

Differentiate electrical symbols and their meanings.

Standard 2

Locate and identify the correct architectural scale on electrical prints.

Standard 3

Match information located on electrical schedules to electrical plans/schematics.

- Panel (circuiting, breaker size, conductor size)
- Fixture
- Conduit

Standard 4

Analyze branch circuit loads based on an electrical plan/schematic.

Performance Skills

- Read and interpret a wiring diagram/electrical plan.
- Install multiple, successful branch circuits as they apply to residential construction per NEC.
- Calculate wire size for each circuit to be installed.
- Calculate breaker size for each circuit to be installed.

STRAND 4: ELECTRICAL THEORY

Students will apply electrical theory to electrical installations.

Standard 1

Demonstrate knowledge of electrical parallel and parallel-series circuits using principles of electricity (Ohm's Law).

- Electromotive Force (Voltage)
- Intensity (Amperage)
- Resistance (Ohms)
- Power (Watts)

Standard 2

Apply mathematical principles to electrical systems.

- Ohm's Law
- Equation manipulation

Performance Skills

- Using the power formula, calculate the amount of power used by a circuit.
- Using the formula of Ohm's Law, calculate an unknown value.

STRAND 5: CONDUIT BENDING – HAND BENDING

Students will implement formulas and demonstrate bending techniques.

Standard 1

Create combinations of conduit-bends.

- Box offset
- Stub 90
- 3-point saddle
- 4-point saddle
- Offset

Standard 2

Use math formulas to determine conduit bends.

Performance Skills

- Install complex conduit bends based on schematics/instructions.

STRAND 6: CTSOs & WORKPLACE SKILLS

Students will be encouraged to participate in a relevant CTSO (Career & Technical Student Organization) through the demonstration of electrician workplace and career readiness skills. These standards will not appear on state skill certification exams, but should be taught throughout the duration of the course.

Standard 1

Students will display personal skills related to the essential values, personality traits, and personal characteristics for success in the electrician profession and life.

- **Integrity** - demonstrate honesty and personal responsibility for actions.
- **Work ethic** - demonstrate tenacity, hard work, excellence, punctuality, meet deadlines; and be self-directed when completing tasks in the electrician professional setting.
- **Professionalism** - demonstrate maturity, self-confidence; and a positive image when working with teammates or clients on electrical installations..
- **Responsibility** - demonstrate dependability, consistency, and personal well-being when safely completing electrical tasks.
- **Adaptability/Flexibility** - Foster creativity, new ideas, and resilience when working to solve problems in electrical installations.
- **Self-motivated** - demonstrate a willingness to learn, independence, initiative, and a positive attitude when approaching new information

Standard 2

Students will display workplace skills related to the essential attitudes and abilities for success in the electrician profession.

- **Communication** – Demonstrates skills in listening and speaking; communicates professionally with teammates, supervisors, and customers in relation to electrical installations..
- **Decision making** – Analyzes key facts, data, and situations to employ reasoning skills for completing installation tasks.
- **Teamwork** – Builds trusting relationships, works cooperatively with others and utilizes individual strengths of team members when completing installation tasks.
- **Planning, organizing, and management** – Designs, prepares, and implements creative tasks within a desired timeframe; Sets priorities and responds to changing priorities.
- **Leadership** – Builds positive relationships and mitigates conflict.

Standard 3

Students will display technical skills that are grounded in design that deliver essential knowledge and competencies for success in the industry.

- **Computer and technology literacy**
- **Job specific skills**
- **Safety and health**
- **Service orientation** – responds to internal and external customers; demonstrates focus and presence; attends to personal matters away from the classroom.
- **Professional development** – demonstrates openness to learn, grow, and change in the construction industry.

Skill Certification Test Points by Strand

Test Name	Test #	Number of Test Points by Strand										Total Points	Total Questions
		1	2	3	4	5	6	7	8	9	10		