

STRANDS AND STANDARDS

ELECTRICIAN 1



Course Description

A program with a sequence of courses that prepares individuals to apply technical knowledge and skills to assemble, install, operate, maintain, and repair electrically energized systems, such as residential, commercial, industrial electric-power systems wiring, D.C. and A.C. motors, controls, and electrical distribution panels. Includes instruction in the use of advanced technology test equipment.

Intended Grade Level	10-12
Units of Credit	0.5
Core Code	40.08.00.00.050
Concurrent Enrollment Core Code	40.08.00.13.050
Prerequisite	None
Skill Certification Test Number	Industry test 952
Test Weight	1.0
License Type	CTE and/or Secondary Education 6-12
Required Endorsement(s)	
Endorsement 1	Electrician
Endorsement 2	N/A
Endorsement 3	N/A



STRAND 1

Students will be able to understand electrical safety.

Standard 1

Demonstrate safe working procedures in a construction environment.

Standard 2

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

Standard 3

Identify electrical hazards and how to avoid or minimize them in the workplace.

Standard 4

Explain safety issues concerning lockout/tagout procedures, personal protection using assured grounding and isolation programs, confirm space entry and fall protection systems.

Performance Skill

Understand electrical safety.

- Demonstrate safe working procedures in a construction environment.
- Explain the purpose of OSHA and how it promotes safety on the job.
- Identify electrical hazards and how to avoid or minimize them in the workplace.
- Explain safety issues concerning lockout/tagout procedures, personal protection using assured grounding and isolation programs, confirm space entry and fall protection systems.

STRAND 2

Students will be able to understand hand bending.

Standard 1

Identify the methods of hand bending conduit.

Standard 2

Identify the various methods used to install conduit.

Standard 3

Use math formulas to determine conduit bends.

Standard 4

Mark 90 degree bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.

Performance Skill

Understand and demonstrate hand bending.

- Identify the methods of hand bending conduit.
- Identify the various methods used to install conduit.

- Use math formulas to determine conduit bends.
- Mark 90 degree bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender.

STRAND 3

Students will be able to understand electrical theory.

Standard 1

Recognize what atoms are and how they are constructed.

Standard 2

Define voltage and identify the ways in which it can be produced.

Standard 3

Explain the difference between conductors and insulators.

Standard 4

Define the units of measurement that are used to measure the properties of electricity.

Standard 5

Explain how voltage, current, and resistance are related to each other.

Standard 6

Using the formula of Ohm's Law, calculate an unknown value.

Standard 7

Explain the different types of meters used to measure voltage, current, and resistance.

Standard 8

Using the power formula, calculate the amount of power used by a circuit.

Performance Skill

Understand and apply electrical theory.

- Recognize what atoms are and how they are constructed.
- Define voltage and identify the ways in which it can be produced.
- Explain the difference between conductors and insulators.
- Define the units of measurement that are used to measure the properties of electricity.
- Explain how voltage, current, and resistance are related to each other.
- Using the formula of Ohm's Law, calculate an unknown value.
- Explain the different types of meters used to measure voltage, current, and resistance.
- Using the power formula, calculate the amount of power used by a circuit.

STRAND 4

Students will be able to understand electrical test equipment.

Standard 1

Explain the operation of and describe the following pieces of test equipment:

- Ammeter
- Volt meter
- Ohm meter
- Continuity tester
- Voltage tester

Standard 2

Explain the importance of proper meter polarity.

Standard 3

Explain the difference between digital and analog meters.

Performance Skill

Understand and demonstrate electrical test equipment.

- Explain the operation of specified test equipment.
- Explain the importance of proper meter polarity.
- Explain the difference between digital and analog meters.

STRAND 5

Students will be able to understand Introduction to the National Electrical Code.

Standard 1

Explain the purpose and history of the National Electric Code (NEC).

Standard 2

Describe the layout of the NEC.

Standard 3

Explain how to navigate the NEC.

Standard 4

Describe the purpose of the National Electrical Manufacturers' Association (NEMA) and the National Fire Protection Association (NFPA).

Standard 5

Explain the role of testing laboratories.

Performance Skill

Identify the National Electrical Code.

- Explain the purpose and history of the National Electric Code (NEC).
- Describe the layout of the NEC.
- Explain how to navigate the NEC.
- Describe the purpose of the National Electrical Manufacturers' Association (NEMA) and the National Fire Protection Association (NFPA).
- Explain the role of testing laboratories.

STRAND 6

Students will be able to understand raceways, boxes, and fittings.

Standard 1

Identify and select various types and sizes of raceways.

Standard 2

Identify and select various types of raceway fittings.

Standard 3

Identify various methods used to install raceways.

Standard 4

Demonstrate knowledge of NEC raceway requirements.

Standard 5

Describe procedures for installing raceways and boxes in a wood frame environment.

Standard 6

Describe procedures for installing raceways and boxes on drywall surfaces.

Standard 7

Recognize safety precautions that must be followed when working with boxes and raceways.

Performance Skill

Understand the application of raceways, boxes, and fittings

- Identify and select various types and sizes of raceways.
- Identify and select various types of raceway fittings.
- Identify various methods used to install raceways.
- Demonstrate knowledge of NEC raceway requirements.
- Describe procedures for installing raceways and boxes in a wood frame environment.
- Describe procedures for installing raceways and boxes on drywall surfaces.
- Recognize safety precautions that must be followed when working with boxes and raceways.

STRAND 7

Students will be able to understand conductors.

Standard 1

Explain the various sizes and gauges of wire in accordance with American Wire Gauge Standards.

Standard 2

Identify insulation and jacket types according to conditions and applications.

Standard 3

Describe voltage ratings of conductors and cables.

Standard 4

Read and identify markings on conductors and cables.

Standard 5

Use the tables in NEC to determine the ampacity of a conductor.

Standard 6

State the purpose of stranded wire.

Standard 7

Describe the different materials from which conductors are made.

Standard 8

Describe the different types of conductor insulation.

Standard 9

Describe the color coding of insulation.

Standard 10

Describe the procedure for pulling wire through conduit.

Standard 11

Install conductors in conduit.

Standard 12

Pull conductors in a conduit system.

Performance Skill

Understand and how to apply conductors in a safe way.

- Explain the various sizes and gauges of wire in accordance with American Wire Gauge Standards.
- Identify insulation and jacket types according to conditions and applications.
- Describe voltage ratings of conductors and cables.
- Read and identify markings on conductors and cables.

- Use the tables in NEC to determine the ampacity of a conductor.
- State the purpose of stranded wire.
- Describe the different materials from which conductors are made.
- Describe the different types of conductor insulation.
- Describe the color coding of insulation.
- Describe the procedure for pulling wire through conduit.
- Install conductors in conduit.
- Pull conductors in a conduit system.

STRAND 8

Students will be able to understand Introduction to the National Electrical Code.

Standard 1

Describe the different types of nonmetallic and metallic boxes.

Standard 2

Properly locate, install, and support boxes of all types.

Standard 3

Understand the NEC requirements for boxes supporting light fixtures.

Standard 4

Install the different types of fittings used in conjunction with boxes.

Standard 5

Explain how boxes and fittings are selected and installed.

Standard 6

Describe the various types of box supports.

Performance Skill

Understand the application of boxes, fittings, and fixtures.

- Describe the different types of nonmetallic and metallic boxes.
- Properly locate, install, and support boxes of all types.
- Understand the NEC requirements for boxes supporting light fixtures.
- Install the different types of fittings used in conjunction with boxes.
- Explain how boxes and fittings are selected and installed
- Describe the various types of box supports.

STRAND 9

Students will understand the importance of career readiness skills as it relates to the workplace and outlined in the SkillsUSA Framework – Level 1.

Standard 1

Understand and demonstrate the attitude of cooperation.

- Develop awareness of cultural diversity and equality issues.
- Demonstrate effective communication with others.
- Apply team skills to a group project.
- Identify and apply conflict resolution skills.

Standard 2

Understand and demonstrate the ability of being resourceful and innovative.

- Discover self-motivation techniques and establish short-term goals.
- Measure/modify short-term goals.
- Review a professional journal and develop a three- to five-minute presentation.

Standard 3

Plan for your future career.

- Complete a self-assessment and identify individual learning styles.
- Define future occupations.
- Identify the components of an employment portfolio.
- List proficiency in program competencies.
- Complete a survey for employment opportunities.
- Create a job application.
- Assemble your employment portfolio.
- Employability skills: evaluate program comprehension.

Standard 4

Understand and demonstrate the ability to manage a project.

- Apply team skills to a group project.
- Observe and critique a meeting.
- Demonstrate business meeting skills.
- Explore supervisory and management roles in an organization.
- Identify and apply conflict resolution skills.
- Demonstrate evaluation skills.
- Manage a project and evaluate others.