

STRANDS AND STANDARDS

ELECTRICIAN 2



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	40.08.00.00.055
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	Electrician
Endorsement 2	N/A
Endorsement 3	N/A

STRAND 1

Students will participate in personal and leadership development activities through SkillsUSA or another appropriate career and technical student organization.

Standard 1

Student will use communication skills to effectively communicate with others.

- Understand when it is appropriate to listen and to speak.
- Understand and follow verbal and written instructions for classroom and laboratory activities.

Standard 2

Student will effectively use teamwork to respectfully work with others.

- Identify and understand different roles in working with a team.

Standard 3

Student will use critical thinking and problem-solving skills.

- Analyze the cause of the problem.
- Develop a solution to address the problem.
- Implement the plan.
- Evaluate the effectiveness of the plan.

Standard 4

Student will be dependable, reliable, steady, trustworthy, and consistent in performance and behavior.

- Set and meet goals on attendance and punctuality.
- Prioritize, plan, and manage work to complete assignments and projects on time.

Standard 5

Student will be accountable for results.

- Use an achievement chart for activities and behaviors in class that encourages a personal evaluation of classroom performance.
- File a regular written report on progress toward completion of assignments and projects

Standard 6

Be familiar with the legal requirements and expectations of the course.

- Be familiar with the course disclosure statement and all requirements for successful completion of the course.
- Demonstrate workplace ethics, e.g., fair, honest, disciplined.

STRAND 2

Students will participate in work-place readiness activities.

Standard 1

Student will demonstrate employability skills.

- Use a career search network to find career choices.
- Write a resume including a list of demonstrated skills.
- Write a letter of application.
- Complete a job application.
- Participate in an actual or simulated job interview.

Standard 2

Student will participate in a work-based learning experience outside the classroom.

- Student will plan and implement a work-based learning experience aligned with their career goal.

STRAND 3

Students will 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 Skills

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 4

Students will 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 Skills

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 5

Students will understand fasteners and anchors.

Standard 1

Identify and explain the use of anchors.

Standard 2

Demonstrate the correct applications for fasteners and anchors.

Performance Skills

Understand the application of fasteners and anchors.

- Identify and explain the use of anchors.
- Demonstrate the correct applications for fasteners and anchors.

STRAND 6

Students will understand electrical theory.

Standard 1

Explain the basic characteristics of a series circuit.

Standard 2

Explain the basic characteristics of a parallel circuit.

Standard 3

Explain the basic characteristics of a series parallel circuit.

Standard 4

Calculate, using Kirchoff's Current Law, the total current in parallel and series circuits.

Standard 5

Find the total amount of resistance in a series circuit.

Standard 6

Find the total amount of resistance in a parallel circuit.

Standard 7

Find the total amount of resistance in a series-parallel circuit.

Performance Skills

Understand and apply electrical theory.

- Explain the basic characteristics of a series circuit.
- Explain the basic characteristics of a parallel circuit.
- Explain the basic characteristics of a series parallel circuit.
- Calculate, using Kirchoff's Current Law, the total current in parallel and series circuits.
- Find the total amount of resistance in a series circuit.
- Find the total amount of resistance in a parallel circuit.
- Find the total amount of resistance in a series-parallel circuit.

STRAND 7

Students will understand electrical test equipment.

Standard 1

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

- Ammeter
- Volt meter
- Ohm meter
- Volt-ohm meter (VOM)
- Continuity tester
- Voltage tester

Standard 2

Explain the importance of proper meter polarity.

Standard 3

Explain the difference between digital and analog meters.

Performance Skills

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 8

Students will understand an 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 Skills

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 9

Students will understand raceways, boxes, and raceway 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 on drywall surfaces.

Standard 6

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

Performance Skills

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 on drywall surfaces.
- Recognize safety precautions that must be followed when working with boxes and raceways.

STRAND 10

Students will 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

Describe voltage ratings of 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 Skills

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 11

Students will understand the application of boxes, fittings, and fixtures.

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.