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.

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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.