

Teacher Assessment Blueprint

Electrical Construction Technology



Test Code: 5271 / Version: 01

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General Assessment Information

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Test Type: The Electrical Construction Technology assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the following states: Connecticut, Kentucky, New York, and Pennsylvania.



46.0399- Electrical and
Power Transmission
Installers, Other



Career Cluster 2-
Architecture and
Construction



47-2111.00- Electricians



In the lower division
baccalaureate/associate degree
category, 3 semester hours in
Construction, General Technology
or Applied Science

Written Assessment

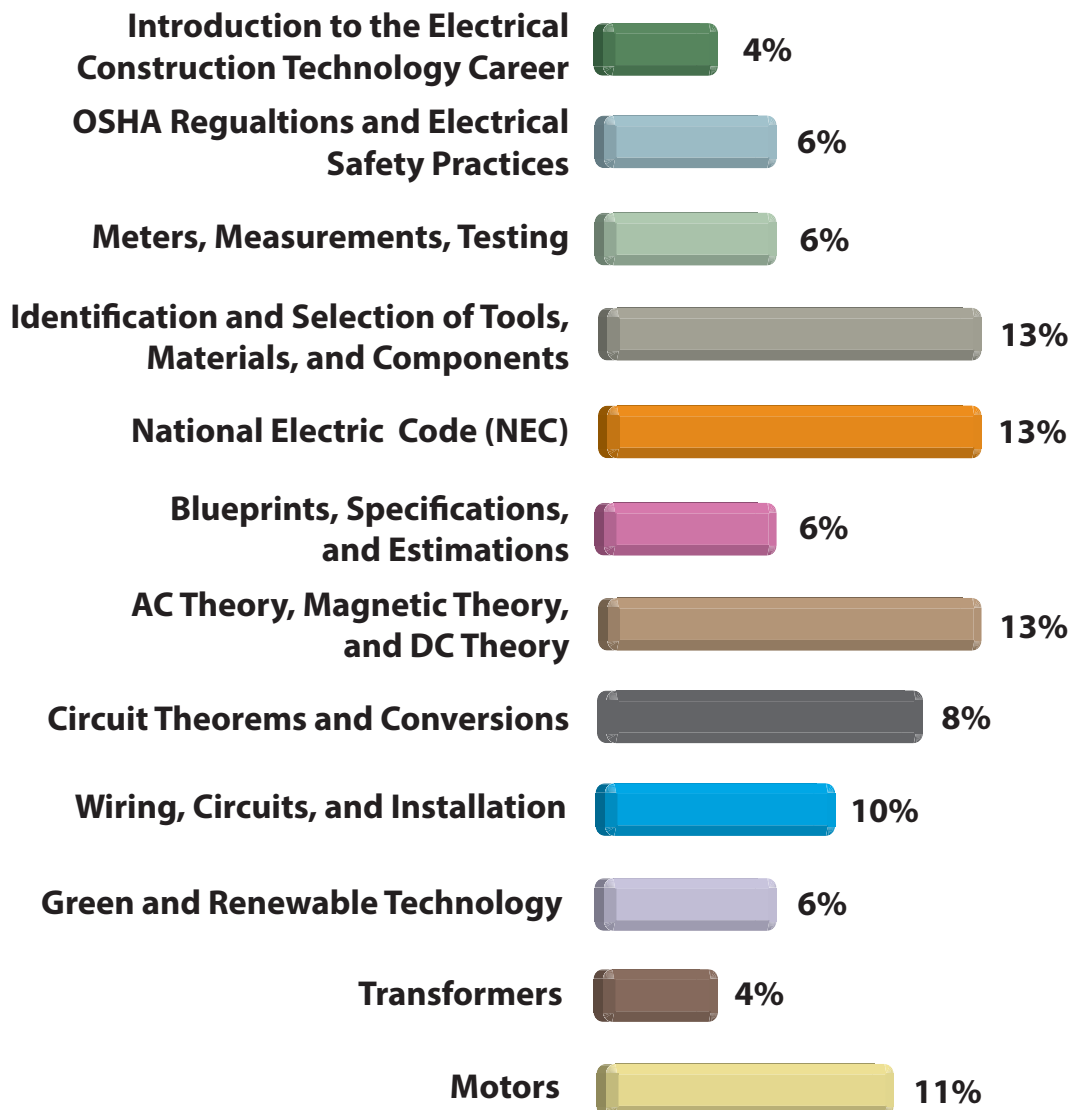
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 158

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

Introduction to the Electrical Construction Technology Career

- Identify various electrical construction technology positions and responsibilities
- Identify career-related professional organizations and their purpose

OSHA Regulations and Electrical Safety Practices

- Identify proper use of personal protective equipment (PPE) according to NFPA 70E standards
- Explain the purpose of OSHA
- Identify procedures for fire, ladder, and environmental safety according to OSHA standards (including lock-out/tag-out)

Meters, Measurements, Testing

- Identify characteristics, uses, and connections of meters and measuring devices
- Identify meter safety procedures

Identification and Selection of Tools, Materials, and Components

- Identify and correctly use hand and power tools
- Identify and select proper conductor cable type
- Identify and select proper conduit, boxes, and fittings
- Identify the function and purpose of various specialty equipment, including Ground Fault Circuit Interrupter (GFCI), Arc-Fault Circuit Interrupter (AFCI), Tamper-Resistant, and Transient Voltage Surge Suppressor (TVSS)
- Identify commonly used listed and labeled equipment



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Specific Standards and Competencies (continued)

National Electric Code (NEC)

- Explain NEC and how it is organized
- Explain procedures involved in NEC wiring methods, materials, and protection regulations
- Identify basic service entrance requirements
- Properly apply NEC tables and charts
- Describe proper bonding and grounding methods

Blueprints, Specifications, and Estimations

- Identify and interpret electrical symbols and specifications in blueprints and/or plans
- Identify and interpret wiring and schematic diagrams
- Demonstrate planning and layout of a circuit

AC Theory, Magnetic Theory, and DC Theory

- Identify characteristics of AC circuits
- Explain capacitance, inductance, impedance, current, voltage, and resistance
- Calculate power consumption, dissipation, and loss
- Demonstrate principles of magnetic theory
- Identify materials as insulators, conductors, and semi-conductors
- Identify characteristics and components of DC circuits



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Specific Standards and Competencies (continued)

Circuit Theorems and Conversions

- Identify and apply various circuit theorems, including Ohm's Law, Kirchhoff's Law, Watt's Law, and electron theory
- Interpret meter readings
- Identify and apply various mathematical conversions, including scientific, engineering, and metric notations/conversions

Wiring, Circuits, and Installation

- Select appropriate wiring for specific installations (residential and commercial)
- Install various switching arrangements
- Install cabling, raceways, conduit, boxes, wiring, devices, and trims
- Test and troubleshoot completed installation

Green and Renewable Technology

- Discuss wind turbine, solar energy, and other renewable sources of energy
- Explain the function and characteristics of rectifiers, inverters, and filters
- Describe energy management devices (e.g., LED lighting, CFLs, occupancy sensors)

Transformers

- Identify and calculate voltage/current for primary and secondary windings
- Determine KVA capacity and differentiate between Delta and Wye connections

Motors

- Describe characteristics of various types of motors
- Identify and connect motor connections per nameplate (Delta/Wye and single-phase)
- Test, troubleshoot, and reverse motor rotation
- Select short-circuit and overload protection for specific applications
- Identify and interpret motor nameplate information (e.g. voltage and phases)

Sample Questions

Measure the current in a circuit with a/an

- A. voltmeter
- B. ohmmeter
- C. anemometer
- D. ammeter

AWG units are units used to express conductor sizes and represent the

- A. Associated Wire Gage
- B. American Wire Gage
- C. Apiarian Wire Gage
- D. Approximate Wire Gage

The AC voltage waveform is called a _____ wave.

- A. cosine
- B. full
- C. half
- D. sinusoidal

Electromotive force is measured in

- A. watts
- B. ohms
- C. amps
- D. volts

A rectifier converts

- A. alternating voltage to direct voltage
- B. alternating voltage to direct current
- C. farads to microfarads
- D. megohms to ohms

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 3 hours, 20 minutes

Number of Jobs: 3

Areas Covered:

34% Bend Conduit

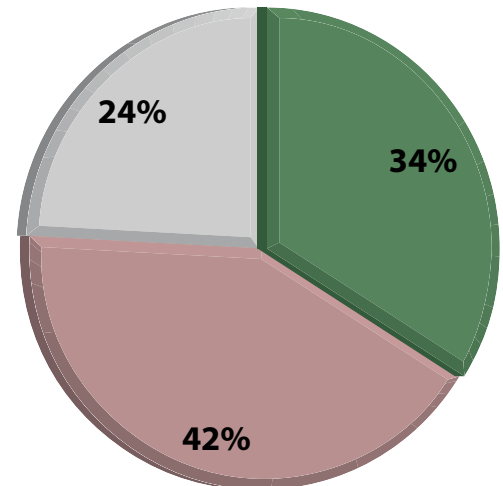
Participant will safely install boxes onto the wall, and use proper bending and cutting techniques to install conduit.

42% Switching and GFCI Receptacle in a Residential Setting

Participant will properly mount boxes, install wiring and devices, and complete the job in a neat operational manner following safety standards.

24% Install Two Smoke Alarms in a Commercial Setting

Participant will install interconnected components to operate properly following safety standards.



Sample Job

Install Two Smoke Alarms in a Commercial Setting

Maximum Time: 1 hour

Participant Activity: The participant will install two smoke alarms in a commercial setting referring to the drawings provided, using MC 14-2 and 14-3 AWG, install two interconnected smoke alarms, use a separate circuit, and home run first smoke alarm; interconnect between the two smoke alarms.

