

Teacher Assessment Blueprint

Electrical Construction Technology



Test Code: 5271 / Version: 01

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## General Assessment Information

### Blueprint Contents

General Assessment Information	Sample Written Items
Written Assessment Information	Performance Assessment Information
Specific Competencies Covered in the Test	Sample Performance Job

**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



**NATIONAL COLLEGE CREDIT RECOMMENDATION SERVICE**  
University of the State of New York - Regents Research Fund

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

## Written Assessment

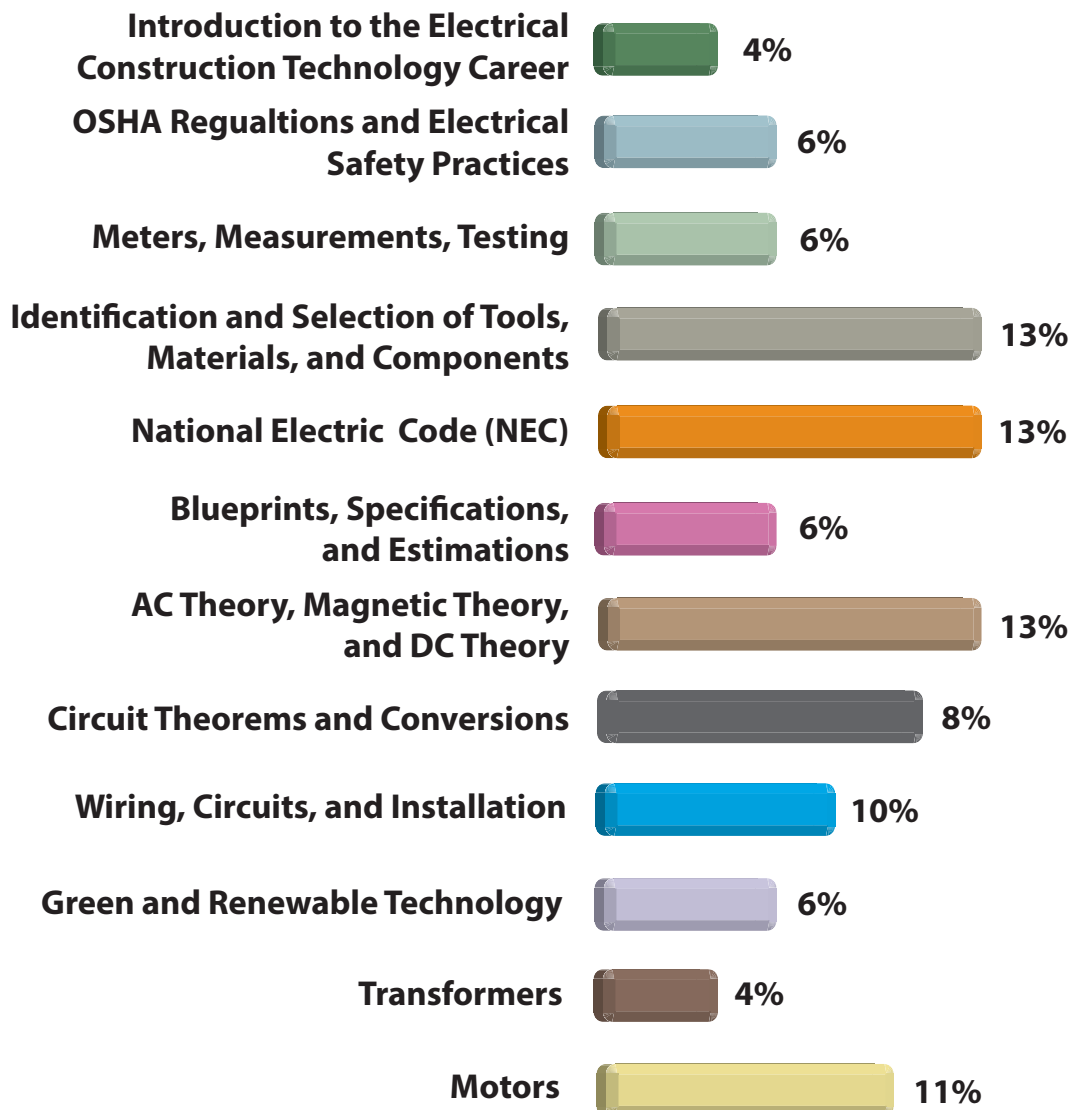
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

**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**

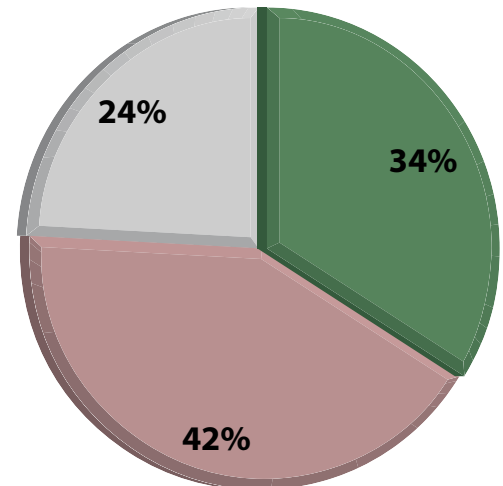
Participant will safely install boxes onto the wall, and use proper bending and cutting techniques to install conduit.

#### **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.

