**LEVEL 1**

**ELECTRICAL**

**Contact Information**

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**Continued on following page**

**Course Description**

Conduit Bending

Describes how to cut, ream, and thread conduit.

Describes how to use it to find the installation requirements. Provides an overview of the National Electrical Manufacturers Association and Nationally Recognized Testing Laboratories.

**Course Title**

Introduction to the National Electrical Code

(7.5 Hours)


(Module ID 26105-20) Introduces the NEC® and explains how to use it to find the installation requirements. Provides an overview of the National Electrical Manufacturers Association and Nationally Recognized Testing Laboratories.

**Course Title**

Occupational Overview: The Electrical Industry

(2.5 Hours)


(Module ID 26101-20) Provides an overview of the electrical craft and discusses the career paths available to electricians, including apprenticeship requirements.

**Course Title**

Device Boxes

(10 Hours)


(Module ID 26106-20) Describes the various types of boxes and explains how to calculate the NEC® fill requirements for outlet boxes and conduit benders on the NEC®.

**Course Title**

Pull and Junction Boxes

(12.5 Hours)

ISBN 978-0-13-690752-1

(Module ID 26205-20) Describes how to size and install pull and junction boxes. Identifies various specialty enclosures, including conduit bodies, FS and FD boxes, and handholes.

**Course Title**

Conductor Installations

(10 Hours)

ISBN 978-0-13-690717-0

(Module ID 26206-20) Describes how to prepare conduit for install in metal. Explains how to pull conduit benders on the NEC®.

**Course Title**

Cable Tray

(7.5 Hours)


(Module ID 26207-20) Describes various types of cable tray, supports, and associated fittings. Explains how to install conduit on a cable tray and calculate fill per NEC® requirements.

**Course Title**

Conductor Terminations and Splices

(7.5 Hours)


(Module ID 26208-20) Explains how to prepare cable ends for terminations and splices. Describes how to train cable at termination points and describes crimping techniques.

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Grounding and Bonding (15 Hours)
ISBN 978-0-13-689735-4
(Module ID 26209-20) Explains the grounding and bonding requirements of NEC Article 250. Covers how to size the main and system bonding jumpers and the grounding electrode conductor for various AC systems.

Circuit Breakers and Fuses (12.5 Hours)
(Module ID 26210-20) Describes the operating principles of circuit breakers and fuses, and explains how to select and install overcurrent devices.

Control Systems and Fundamental Concepts
(Module ID 26211-20) Describes the operating principles of controllers and relays, including both mechanical and solid-state devices. Explains how to select and install relays and troubleshoot control circuits.

Conductor Selection and Calculations (15 Hours)
(Module ID 26301-20) Explains how to calculate branch circuit and feeder loads for residential and commercial applications. Covers various derating factors.

L3 ELECTRICAL

Curriculum Notes
- 155 Hours
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK
Trainee Guide: $99.99
Individual Modules: $24.99

DIGITAL
NCCERconnect Access Card: $99.99
NCCERconnect + Trainee Guide: $124.99

MODULES
The modules listed below are included in the Trainee Guide. The following ISBNs are for ordering individual modules only.

Load Calculations — Branch and Feeder Circuits
(17.5 Hours)
(Module ID 26301-20) Explains how to calculate branch circuit and feeder loads for residential and commercial applications. Covers various derating factors.

Transformer (12.5 Hours)
(Module ID 26307-20) Describes the construction, operation, and applications of various transformers. Covers transformer connections and grounding requirements.

Commercial Electrical Services (10 Hours)
(Module ID 26308-20) Covers the components, installation considerations, and NEC® requirements for commercial services.

Motor Calculations (12.5 Hours)
(Module ID 26309-20) Covers the calculations required to size the conductors and overcurrent protection required for motor applications.

Voice, Data, & Video (10 Hours)
(Module ID 26310-20) Covers the installation, termination, and testing of these systems.

Motor Controls (12.5 Hours)
(Module ID 26311-20) Provides information on selecting, sizing, and installing motor controllers, as well as control circuit pilot devices and basic relay logic.

Basic Electronic Theory (10 Hours)
(Module ID 26404-20) Explains the function and operation of basic electronic devices, including semiconductors, diodes, rectifiers, and transistors.

Fire Alarm Systems (15 Hours)
(Module ID 26405-20) Explores the technologies, codes, and wiring approaches used to assemble a fire alarm system. Examines installation and troubleshooting techniques.

Specialty Transformers (10 Hours)
(Module ID 26406-20) Covers various types of transformers, and provides information on selecting, sizing, and installing them.

Advanced Controls (20 Hours)
(Module ID 26407-20) Discusses applications and operating principles of various control system components, such as solid-state relays, reduced-voltage starters, and adjustable-frequency drives. Covers basic troubleshooting procedures.

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Much of the technology in emerging fields—such as wireless, integrated, and voice and data systems—has evolved greatly since the publication of Advanced Electrical Topics Volumes One and Two. Because of this, NCCER and Pearson suggest that those teaching a five-year electrical apprenticeship program use the following compilation of modules drawn from EST and Instrumentation.

**Trainee Guide:** $109.99  

- **Cable Selection** 33208-10  
- **Wire and Cable Terminations** 33209-10  
- **CCTV Systems** 33410-12  
- **Access Control Systems** 33411-12  
- **Buses and Networks** 33301-11  
- **Fiber Optics** 33302-11  
- **Programmable Logic Controllers** 12406-03  
- **Broadband Systems** 33403-12  
- **Distributed Control Systems** 12407-03  
- **Intrusion Detection Systems** 33407-12  
- **Audio Systems** 33401-12  
- **Overview of Nurse Call and Signaling Systems** 33409-12

**PAPERBACK**  

Trainee Guide: $29.99  

Managing Electrical Hazards

- A copy of NFPA 70E®, Standard for Electrical Safety in the Workplace, 2018 Edition, is required material for this course. To order, contact NFPA at www.nfpa.org or 1-800-344-3555.

Introduces electrical hazards in the workplace and describes how to avoid them. Explains how to analyze and document shock and arc flash hazards, and how to plan and conduct work around them. Includes examples of how to complete an energized electrical work permit, and how to select the specialized personal protective equipment required for electrical work.

**12.5 Hours**  
Updated in 2018.  
Module ID 26501

Advanced Electrical Topics

Much of the technology in emerging fields—such as wireless, integrated, and voice and data systems—has evolved greatly since the publication of Advanced Electrical Topics Volumes One and Two. Because of this, NCCER and Pearson suggest that those teaching a five-year electrical apprenticeship program use the following compilation of modules drawn from EST and Instrumentation.

**Trainee Guide:** $109.99  

- **Cable Selection** 33208-10  
- **Wire and Cable Terminations** 33209-10  
- **CCTV Systems** 33410-12  
- **Access Control Systems** 33411-12  
- **Buses and Networks** 33301-11  
- **Fiber Optics** 33302-11  
- **Programmable Logic Controllers** 12406-03  
- **Broadband Systems** 33403-12  
- **Distributed Control Systems** 12407-03  
- **Intrusion Detection Systems** 33407-12  
- **Audio Systems** 33401-12  
- **Overview of Nurse Call and Signaling Systems** 33409-12

**10 Hours**

- **Managing Electrical Hazards**
- **Heat Tracing and Freeze Protection**
- **Motor Operation and Maintenance**
- **Medium-Voltage Terminations/Splices**
- **Special Locations**
- **Fundamentals of Crew Leadership**

**26501**

12.5 Hours

Updated in 2018.

Module ID 26501

PAPERBACK

- **ISBN** 978-0-13-518319-9

- **Trainee Guide:** $29.99

**13 Hours**

- **Module ID 26408-20** Provides a basic overview of HVAC systems and their controls.

**10 Hours**

- **Module ID 26409-20** Presents heat-tracing and freeze-protection systems along with various applications and installation requirements.

**10 Hours**

- **Module ID 26410-20** Covers motor care procedures, including cleaning, testing, and preventive maintenance. Describes basic troubleshooting procedures.

**11 Hours**

- **Module ID 26411-20** Identifies types of medium-voltage cable and describes how to make various splices and terminations. Covers hi-pot testing.

**20 Hours**

- **Module ID 26412-20** Describes the NEC requirements for selecting and installing equipment, enclosures, and devices for special locations that require unique attention. Locations include places of public assembly, theaters, carnivals, agricultural and livestock facilities, marinas, swimming pools, and temporary facilities.

**22.5 Hours**

- **Module ID 46101** Covers basic leadership skills and explains different leadership styles, communication, delegating, and problem solving. Jobsite safety and the crew leader’s role in safety are discussed, as well as project planning, scheduling, and estimating. Includes performance tasks to assist the learning process.