Electrical

MODULES

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

Orientation to the Electrical Trade (2.5 Hours)
(Module ID 26101-17) Provides an overview of the electrical trade and discusses the career paths available to electricians.

Electrical Safety (10 Hours)
(Module ID 26102-17) Covers safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Also covers the OSHA-mandated lockout/tagout procedure.

Introduction to Electrical Circuits (7.5 Hours)
(Module ID 26103-17) Introduces electrical concepts used in Ohm’s law applied to DC series circuits. Covers atomic theory, electromagnetic force, resistance, and electric power equations.

Electrical Theory (7.5 Hours)
(Module ID 26104-17) Introduces series, parallel, and series-parallel circuits. Covers resistive circuits, Kirchhoff’s voltage and current laws, and circuit analysis.

Introduction to the National Electrical Code® (7.5 Hours)
(Module ID 26105-17) Provides a road map for using the NEC®. Introduces the layout and the types of information found within the code book. Allows trainees to practice finding information using an easy-to-follow procedure.

Device Boxes (10 Hours)
(Module ID 26106-17) Covers the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Also covers NEC® fill and pull requirements for device, pull, and junction boxes under 100 cubic inches.

Hand Bending (10 Hours)
ISBN 978-0-13-480488-0
(Module ID 26107-17) Introduces conduit bending and installation. Covers the techniques for using hand-operated and step conduit benders, as well as cutting, reaming, and threading conduit.

Raceways and Fittings (20 Hours)
ISBN 978-0-13-480491-0
(Module ID 26108-17) Introduces the types and applications of raceways, wireways, and ducts. Stresses the applicable NEC® requirements.

Conductors and Cables (10 Hours)
(Module ID 26109-17) Focuses on the types and applications of conductors and covers proper wiring techniques. Stresses the applicable NEC® requirements.

Basic Electrical Construction Drawings (7.5 Hours)
(Module ID 26110-17) Describes electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams.

Residential Electrical Services (15 Hours)
(Module ID 26111-17) Covers the electrical devices and wiring techniques common to residential construction and maintenance. Allows trainees to practice making service calculations. Stresses the applicable NEC® requirements.

Electrical Test Equipment (5 Hours)
(Module ID 26112-17) Covers proper selection, inspection, and use of common electrical test equipment, including voltage testers, clamp-on ammeters, ohmmeters, multimeters, phase/motor rotation testers, and data recording equipment. Also covers safety precautions and meter category ratings.

Continued on following page
### Electrical Level 2 (continued)

#### Circuit Breakers and Fuses (12.5 Hours)
(Module ID 26210-17) Describes fuses and circuit breakers along with their practical applications. Also covers sizing.

#### Control Systems and Fundamental Concepts (12.5 Hours)
(Module ID 26211-17) Gives basic descriptions of various types of contactors and relays along with their practical applications.

#### Conductor Selection and Calculations (15 Hours)
(Module ID 26302-17) Covers the factors involved in conductor selection, including insulation types, current-carrying capacity, temperature ratings, and voltage drop.

#### Practical Applications of Lighting (12.5 Hours)
(Module ID 26303-17) Describes specific types of incandescent, fluorescent, and HID lamps, as well as ballasts. Also covers troubleshooting and various types of lighting controls.

#### Hazardous Locations (15 Hours)
(Module ID 26304-17) Presents the NEC® requirements for equipment installed in hazardous locations.

#### Overcurrent Protection (25 Hours)
(Module ID 26305-17) Explains how to size and select circuit breakers and fuses for various applications. Also covers short circuit calculations and troubleshooting.

#### Distribution Equipment (12.5 Hours)
(Module ID 26306-17) Discusses switchboards and switchgear, including installation, grounding, and maintenance requirements. Includes a set of drawings.

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

#### L3 Electrical

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<td>Trainee Guide</td>
<td>978-0-13-473823-9</td>
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#### L4 Electrical

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<td>Individual Modules</td>
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#### Load Calculations — Branch and Feeder Circuits (17.5 Hours)
(Module ID 26301-17) Explains how to calculate branch circuit and feeder loads for residential and commercial applications.

#### Fire Alarm Systems (15 Hours)
ISBN 978-0-13-480547-4
(Module ID 26405-17) Covers fire alarm control units, Digital Alarm Communicator Systems (DACS), wiring for alarm initiating and notification devices, and alarm system maintenance.

#### Specialty Transformers (10 Hours)
(Module ID 26406-17) Covers various types of transformers and their applications. Also provides information on selecting, sizing, and installing these devices.

#### Advanced Controls (20 Hours)
(Module ID 26407-17) Discusses applications and operating principles of solid-state controls, reduced-voltage starters, and adjustable frequency drives. Also covers basic troubleshooting procedures.

#### HVAC Controls (15 Hours)
(Module ID 26408-17) Provides a basic overview of HVAC systems and their controls. Also covers electrical troubleshooting and NEC® requirements.

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Continued on following page
Electrical Level 4 (continued)

Heat Tracing and Freeze Protection  (10 Hours)
(Module ID 26409-17) Covers heat tracing systems along with their applications and installation requirements.

Motor Operation and Maintenance  (10 Hours)
(Module ID 26410-17) Covers motor cleaning, testing, and preventive maintenance. Also describes basic troubleshooting procedures.

Medium-Voltage Terminations/Splices  (10 Hours)
ISBN 978-0-13-480561-0
(Module ID 26411-17) Offers an overview of the NEC® and cable manufacturers’ requirements for medium-voltage terminations and splices.

Special Locations  (20 Hours)
(Module ID 26412-17) Describes NEC® requirements for selecting and installing equipment, enclosures, and devices in special locations including places of assembly, theaters, carnivals, agricultural buildings, marinas, temporary installations, wired partitions, and swimming pools.

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.

Fundamentals of Crew Leadership  (22.5 Hours)
(Module ID 46101-17, Third Edition) 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.

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.

BINDER
Trainee Guide: $105

PAPERBACK
Trainee Guide: $25

Managing Electrical Hazards

12.5 Hours
Updated in 2018
Module ID 26501

Heat Tracing and Freeze Protection

Motor Operation and Maintenance

Medium-Voltage Terminations/Splices
ISBN 978-0-13-480561-0

Special Locations

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