



Electrical

L1 ELECTRICAL

LEVEL 1



Electrical

Curriculum Notes

- 185 Hours
 - Includes 72.5 hours of Core Curriculum, which is a prerequisite for Level 1 completion and must be purchased separately.
 - Hardcover: \$57, ISBN 978-0-13-413143-6
 - Paperback: \$54, ISBN 978-0-13-413098-9
- Revised: Summer 2017, Ninth Edition, to reflect 2017 NEC®
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.
- A Spanish translation of the 2008 NEC® version is available. Please see NCCER's online catalog for more information.

HARDCOVER	ISBN
Trainee Guide: \$69	978-0-13-480473-6
PAPERBACK	ISBN
Trainee Guide: \$67	978-0-13-473820-8
Individual Modules: \$20	see module list
DIGITAL	ISBN
NCCERconnect Access Card: \$67	978-0-13-481232-8
NCCERconnect + Hardcover Trainee Guide: \$94	978-0-13-482066-8
NCCERconnect + Paperback Trainee Guide: \$92	978-0-13-482069-9

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)

ISBN 978-0-13-480474-3
(Module ID 26101-17) Provides an overview of the electrical trade and discusses the career paths available to electricians.

Electrical Safety (10 Hours)

ISBN 978-0-13-480477-4
(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)

ISBN 978-0-13-480479-8
(Module ID 26103-17) Introduces electrical concepts used in Ohm's law applied to DC series circuits. Covers atomic theory, electromotive force, resistance, and electric power equations.

Electrical Theory (7.5 Hours)

ISBN 978-0-13-480481-1
(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)

ISBN 978-0-13-480483-5
(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)

ISBN 978-0-13-480487-3
(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)

ISBN 978-0-13-480494-1
(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)

ISBN 978-0-13-480496-5
(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)

ISBN 978-0-13-478332-1
(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)

ISBN 978-0-13-478339-0
(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.

L2 ELECTRICAL

LEVEL 2

Curriculum Notes

- 145 Hours
- Revised: Summer 2017, Ninth Edition, to reflect 2017 NEC®
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

HARDCOVER	ISBN
Trainee Guide: \$99	978-0-13-480472-9
PAPERBACK	ISBN
Trainee Guide: \$97	978-0-13-473821-5
Individual Modules: \$20	see module list
DIGITAL	ISBN
NCCERconnect Access Card: \$97	978-0-13-481244-1
NCCERconnect + Hardcover Trainee Guide: \$124	978-0-13-477897-6
NCCERconnect + Paperback Trainee Guide: \$122	978-0-13-482067-5

MODULES

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

Alternating Current (17.5 Hours)

ISBN 978-0-13-478337-6
(Module ID 26201-17) Describes forces that are characteristic of alternating-current systems and the application of Ohm's law to AC circuits.

Motors: Theory and Application (20 Hours)

ISBN 978-0-13-478336-9
(Module ID 26202-17) Covers AC and DC motors, including the main components, circuits, and connections.

Electric Lighting (15 Hours)

ISBN 978-0-13-478335-2
(Module ID 26203-17) Introduces principles of human vision and the characteristics of light. Focuses on the handling and installation of various types of lamps and lighting fixtures.

Conduit Bending (15 Hours)

ISBN 978-0-13-478333-8
(Module ID 26204-17) Covers bends in conduit up to 6 inches. Focuses on mechanical, hydraulic, and electrical benders.

Pull and Junction Boxes (12.5 Hours)

ISBN 978-0-13-480498-9
(Module ID 26205-17) Explains how to select and size pull boxes, junction boxes, and handholes.

Conductor Installations (10 Hours)

ISBN 978-0-13-480499-6
(Module ID 26206-17) Covers the transportation, storage, and setup of cable reels; methods of rigging; and procedures for complete cable pulls in raceways and cable trays.

Cable Tray (7.5 Hours)

ISBN 978-0-13-480502-3
(Module ID 26207-17) Focuses on NEC® installation requirements for cable tray, including cable installations.

Conductor Terminations and Splices (7.5 Hours)

ISBN 978-0-13-480504-7
(Module ID 26208-17) Describes methods of terminating and splicing conductors, including preparing and taping conductors.

Grounding and Bonding (15 Hours)

ISBN 978-0-13-480506-1
(Module ID 26209-17) Focuses on the purpose of grounding and bonding electrical systems. Thoroughly covers NEC® requirements.

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Electrical Level 2 (continued)

Circuit Breakers and Fuses (12.5 Hours)

ISBN 978-0-13-480509-2

(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)

ISBN 978-0-13-480511-5

(Module ID 26211-17) Gives basic descriptions of various types of contactors and relays along with their practical applications.

L3 ELECTRICAL

LEVEL 3

Curriculum Notes

- 155 Hours
- Revised: Summer 2017, Ninth Edition, to reflect 2017 NEC®
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$97
Individual Modules: \$20

ISBN
978-0-13-473823-9
see module list

DIGITAL

NCCERconnect Access Card: \$97
NCCERconnect +
Trainee Guide: \$122

ISBN
978-0-13-481266-3
978-0-13-482070-5

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)

ISBN 978-0-13-480513-9

(Module ID 26301-17) Explains how to calculate branch circuit and feeder loads for residential and commercial applications.

Conductor Selection and Calculations (15 Hours)

ISBN 978-0-13-480514-6

(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)

ISBN 978-0-13-480515-3

(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)

ISBN 978-0-13-480522-1

(Module ID 26304-17) Presents the NEC® requirements for equipment installed in hazardous locations.

Overcurrent Protection (25 Hours)

ISBN 978-0-13-480523-8

(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)

ISBN 978-0-13-480524-5

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

Transformers (12.5 Hours)

ISBN 978-0-13-480527-6

(Module ID 26307-17) Discusses transformer types, construction, connections, protection, and grounding.

Commercial Electrical Services (10 Hours)

ISBN 978-0-13-480530-6

(Module ID 26308-17) Covers the components, installation considerations, and NEC® requirements for commercial services.

Motor Calculations (12.5 Hours)

ISBN 978-0-13-480531-3

(Module ID 26309-17) Covers calculations required to size conductors and overcurrent protection for motor applications.

Voice, Data, and Video (10 Hours)

ISBN 978-0-13-480533-7

(Module ID 26310-17) Covers installation, termination, and testing of voice, data, and video cabling systems.

Motor Controls (12.5 Hours)

ISBN 978-0-13-480536-8

(Module ID 26311-17) Provides information on selecting, sizing, and installing motor controllers. Also covers control circuit pilot devices and basic relay logic.

L4 ELECTRICAL

LEVEL 4

Curriculum Notes

- 182.5 Hours
- Revised: Summer 2017, Ninth Edition, to reflect 2017 NEC®
- Downloadable instructor resources that include module tests, PowerPoints®, and performance profile sheets are available at www.nccer.org/irc.

PAPERBACK

Trainee Guide: \$97
Individual Modules: \$20

ISBN
978-0-13-473822-2
see module list

DIGITAL

NCCERconnect Access Card: \$97
NCCERconnect +
Trainee Guide: \$122

ISBN
978-0-13-481268-7
978-0-13-482071-2

MODULES

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

Load Calculations — Feeders and Services (20 Hours)

ISBN 978-0-13-480538-2

(Module ID 26401-17) Topics include basic calculation procedures for commercial and residential applications.

Health Care Facilities (10 Hours)

ISBN 978-0-13-480540-5

(Module ID 26402-17) Covers the installation of electric circuits in health care facilities, including the requirements for life safety and critical circuits.

Standby and Emergency Systems (10 Hours)

ISBN 978-0-13-480543-6

(Module ID 26403-17) Explains the NEC® requirements for electric generators and storage batteries.

Basic Electronic Theory (10 Hours)

ISBN 978-0-13-480546-7

(Module ID 26404-17) Explains the function and operation of basic electronic devices, including semiconductors, diodes, rectifiers, and transistors.

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)

ISBN 978-0-13-480549-8

(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)

ISBN 978-0-13-480551-1

(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)

ISBN 978-0-13-480553-5

(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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Electrical Level 4 (continued)

Heat Tracing and Freeze Protection (10 Hours)

ISBN 978-0-13-480555-9

(Module ID 26409-17) Covers heat tracing systems along with their applications and installation requirements.

Motor Operation and Maintenance (10 Hours)

ISBN 978-0-13-480557-3

(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)

ISBN 978-0-13-480562-7

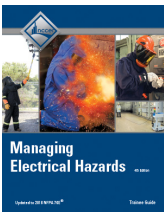
(Module ID 26412-17) Describes NEC® requirements for selecting and installing equipment, enclosures, and devices in special locations including places of assembly, theaters, carnivals, agricultural buildings, marinas, temporary installations, wired partitions, and swimming pools.

Fundamentals of Crew Leadership (22.5 Hours)

ISBN 978-0-13-487188-2

(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.

Managing Electrical Hazards



12.5 Hours
Updated in 2018
Module ID 26501

PAPERBACK
Trainee Guide: \$25

ISBN
978-0-13-518319-9

- 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.

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

ISBN 978-0-13-606502-9

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

