

# Accredited Electrical Program

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## RAYS ELECTRICAL SERVICE, LLC

Rays Electrical Service, LLC, has been in the Electrical business since 2008 and has proven teaching and mentoring strategies in the Electrical Trades. In 2019, the company became a Sponsor and Administrator of the NCCER Standardized Curricula that provides registered credentials to individuals who have successfully completed the required training program within a craft.

Some features of the NCCER Standardized Curricula are as follows:



- An industry-proven record of success
- Curricula developed by the industry, for the industry.
- National standardization providing portability of learned job skills an educational credit.
- Compliance with the Office of Apprenticeship requirements for related classroom training (CFR 29:29)
- Well-illustrated, up-to-date, and practical information

## BENEFITS OF ACCREDITED CLASSROOM TRAINING PROGRAM

Rays Electrical Service is an Accredited Training Sponsor and Administrator of the NCCER and utilizes its standardized training and credentialing program for specific industries. A typical ACTP course encompasses 144 hours of classroom and laboratory training annually. To successfully complete the **Electrical Program requires completing the NCCER Core Curriculum plus Electrical Levels 1 - 4.** Trainees receive transferable credentials issued by NCCER including transcripts, certificates and an initial wallet card that are tracked through the NCCER Registry System upon each level completion.

## CLASS ENROLLMENT

Our classes are offered as an independent education as well as fulfilling the required classroom hours for a registered apprenticeship program. The enrollment in our classes is not a guarantee of employment or apprenticeship.

## EQUAL EDUCATION OPPORTUNITY POLICY

Rays Electrical Service is committed to providing equal education opportunities regardless of sex, race, color, religion, age, national origin, or disability and complies with all federal and state laws.

**COURSE CANCELLATION** – Rays Electrical Service reserves the right to cancel in-person courses and provide an alternative remote method for classroom teaching. Lab or Hands-on training will need to be rescheduled as it must be performed in person at a later date.

## COURSE ATTENDANCE POLICY

Attendance and punctuality are vital to the success of any training and is a requirement for the course. Attendance records are monitored and by each instructor and accessible by the office. Apprentices/craft trainees are responsible for planning in advance with an instructor to make up any absences at the instructor's designated time/date of their availability Please note excessive tardiness or missing class without makeup may result in dismissal from program and/or your employment with no refund.

## REQUIREMENTS - STUDENT REGISTRATION for NCCER CLASSES

To register for an Apprenticeship/Craft Training Program (ACTP), applicants must be 16 years of age, perform 10-grade level math, and signature of acceptance of the student handbook. Please complete the Student Registration form & send by e-mail (lisa@rayselectrical.com) or personally delivered to Lisa at the office of Rays Electrical Service located at 37W904 US Hwy 20, Elgin IL. 60124. A non-refundable \$500 deposit is required for ordering books and reserving a spot in the program in addition to a \$115 Physical Testing fee for Physician Immediate Care for physical test and evaluation.

## ELECTRICAL LEVEL 1 CLASSES- 2021/2022 (This is the First year of a 4-year program)

\*Level 1 Electrical includes the NCCER Core Curriculum: Introductory Craft Skills. The tuition of \$3800 covers NCCER books for Core Curriculum and ELECTRICAL LEVEL 1 with on-line access to NCCER Connect & classroom teaching with required hands-on labs.

**Students will be required to provide their own basic hand tools, basic safety PPE and plan to purchase extra lab materials (ex. conduit, and fittings) for additional practice throughout the course.**

**Please contact Lisa for more information or to schedule an appointment at 847-214-2944.**

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**CORE Curriculum:**

Title	Related Instruction Descriptions	Approx. Hours:
<b>Basic Safety</b>	Presents basic jobsite safety information to prepare workers for the construction environment. Describes the common causes of workplace incidents and accidents and how to avoid them. Introduces common PPE, including equipment required for work at height, and its proper use. Information related to safety in several specific environments, including welding areas and confined spaces, is also provided.	12.5
<b>Introduction to Construction Math</b>	Reviews basic math skills related to the construction trades and demonstrates how they apply to the trades. Covers multiple systems of measurement, decimals, fractions, and basic geometry	10
<b>Introduction to Hand Tools</b>	Introduces common hand tools used in a variety of construction crafts. Identifies tools and how to safely use them. Proper hand tool maintenance is also presented.	10
<b>Introduction to Power Tools</b>	Identifies and describes the operation of many power tools common in the construction environment. Provides instruction on proper use, as well as on safe-handling guidelines and basic maintenance.	10
<b>Introduction to Construction Drawings</b>	Introduces the basic elements of construction drawings. The common components of drawings are presented, as well as the most common drawing types. The use of drawing scales and how to measure drawings is also covered.	10
<b>Introduction to Basic Rigging</b>	Provides basic information related to rigging and rigging hardware, such as slings, rigging hitches, and hoists. Emphasizes safe working habits in the vicinity of rigging operations.	7.5
<b>Basic Communication Skills</b>	Provides good techniques for effective communication on the job. Includes examples that emphasize the importance of both written and verbal communication skills. Describes the importance of reading skills in the construction industry and covers proper techniques to use in a variety of different written communication formats.	7.5
<b>Basic Employability Skills</b>	Describes the opportunities offered by the construction trades. Discusses critical thinking and essential problem-solving skills for the construction industry. Also identifies and discusses positive social skills and their value in the workplace.	7.5
<b>Introduction to Material Handling</b>	Describes the hazards associated with handling materials and provides techniques to avoid both injury and property damage. Common material-handling equipment is also introduced.	10
	<b>Total Core Curriculum Hours:</b>	<b>72.5</b>

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## Electrical 1:

Title	Related Instruction Descriptions	Approx. Hours:
<b>Orientation to the Electrical Trade</b>	Provides an overview of the electrical trade and discusses the career paths available to electricians.	2.5
<b>Electrical Safety</b>	Covers safety rules and regulations for electricians, including precautions for electrical hazards found on the job. Also covers the OSHA-mandated lockout/tagout procedure.	10
<b>Introduction to Electrical Circuits</b>	Introduces electrical concepts used in Ohm's law applied to DC series circuits. Covers atomic theory, electromotive force, resistance, and electric power equations.	7.5
<b>Electrical Theory</b>	Introduces series, parallel, and series parallel circuits. Covers resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis.	7.5
<b>Introduction to the National Electrical Code®</b>	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.	7.5
<b>Device Boxes</b>	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.	10
<b>Hand Bending</b>	Introduces conduit bending and installation. Covers the techniques for using hand-operated and step conduit benders, as well as cutting, reaming, and threading conduit.	10
<b>Raceways and Fittings</b>	Introduces the types and applications of raceways, wireways, and ducts. Stresses the applicable NEC® requirements.	20
<b>Conductors and Cables</b>	Focuses on the types and applications of conductors and covers proper wiring techniques. Stresses the applicable NEC® requirements.	10
<b>Basic Electrical Construction Drawings</b>	Describes electrical prints, drawings, and symbols, and the types of information that can be found on schematics, one-lines, and wiring diagrams.	7.5
<b>Residential Electrical Services</b>	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.	15
<b>Electrical Test Equipment</b>	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.	5
	<b>Total Electrical 1 Curriculum Hours:</b>	<b>107.5</b>

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## Electrical Level 2

Title	Related Instruction Descriptions	Approx. Hours:
Alternating Current	Describes forces that are characteristic of alternating-current systems and the application of Ohm's law to AC circuits.	17.5
Motors: Theory and Application	Covers AC and DC motors, including the main components, circuits, and connections.	20
Electric Lighting	Introduces principles of human vision and the characteristics of light. Focuses on the handling and installation of various types of lamps and lighting fixtures.	15
Conduit Bending	Covers bends in conduit up to 6 inches. Focuses on mechanical, hydraulic, and electrical benders.	15
Pull and Junction Boxes	Explains how to select and size pull boxes, junction boxes, and handholes.	12.5
Conductor Installations	Covers the transportation, storage, and setup of cable reels; methods of rigging; and procedures for complete cable pulls in raceways and cable trays.	10
Cable Tray	Focuses on NEC® installation requirements for cable tray, including cable installations.	7.5
Conductor Terminations and Splices	Describes methods of terminating and splicing conductors, including preparing and taping conductors.	7.5
Grounding and Bonding	Focuses on the purpose of grounding and bonding electrical systems. Thoroughly covers NEC® requirements.	15
Circuit Breakers and Fuses	Describes fuses and circuit breakers along with their practical applications. Also covers sizing.	12.5
Control Systems and Fundamental Concepts	Gives basic descriptions of various types of contactors and relays along with their practical applications	12.5
	<b>Total</b>	<b>145</b>

## Electrical Level 3

Title	Related Instruction Descriptions	Approx. Hours:
Load Calculations: Branch and Feeder Circuits	Explains how to calculate branch circuit and feeder loads for residential and commercial applications.	17.5
Conductor Selection and Calculations	Covers the factors involved in conductor selection, including insulation types, current-carrying capacity, temperature ratings, and voltage drop.	15
Practical Applications of Lighting	Describes specific types of incandescent, fluorescent, and HID lamps, as well as ballasts. Also covers troubleshooting and various types of lighting controls.	12.5
Hazardous Locations	Presents the NEC® requirements for equipment installed in hazardous locations.	15
Overcurrent Protection	Explains how to size and select circuit breakers and fuses for various applications. Also covers short circuit calculations and troubleshooting.	25

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<b>Distribution Equipment</b>	Discusses switchboards and switchgear, including installation, grounding, and maintenance requirements. Includes a set of drawings.	12.5
<b>Transformers</b>	Discusses transformer types, construction, connections, protection, and grounding.	12.5
<b>Commercial Electrical Services</b>	Covers the components, installation considerations, and NEC® requirements for commercial services.	10
<b>Motor Calculations</b>	Covers calculations required to size conductors and overcurrent protection for motor applications.	12.5
<b>Voice, Data, and Video</b>	Covers installation, termination, and testing of voice, data, and video cabling systems.	10
<b>Motor Controls</b>	Provides information on selecting, sizing, and installing motor controllers. Also covers control circuit pilot devices and basic relay logic.	12.5
	<b>Total</b>	<b>155</b>

## Electrical Level 4

<b>Load Calculations: Feeders and Services</b>	Topics include basic calculation procedures for commercial and residential applications.	20
<b>Health Care Facilities</b>	Covers the installation of electric circuits in health care facilities, including the requirements for life safety and critical circuits.	10
<b>Standby and Emergency Systems</b>	Explains the NEC® requirements for electric generators and storage batteries.	10
<b>Basic Electronic Theory</b>	Explains the function and operation of basic electronic devices, including semiconductors, diodes, rectifiers, and transistors.	10
<b>Fire Alarm Systems</b>	Covers fire alarm control units, Digital Alarm Communicator Systems (DACS), wiring for alarm initiating and notification devices, and alarm system maintenance.	15
<b>Specialty Transformers</b>	Covers various types of transformers and their applications. Also provides information on selecting, sizing, and installing these devices.	10
<b>Advanced Controls</b>	Discusses applications and operating principles of solid-state controls, reduced-voltage starters, and adjustable frequency drives. Also covers basic troubleshooting procedures.	20
<b>HVAC Controls</b>	Provides a basic overview of HVAC systems and their controls. Also covers electrical troubleshooting and NEC® requirements.	15
<b>Heat Tracing and Freeze Protection</b>	Covers heat tracing systems along with their applications and installation requirements.	10
<b>Motor Operation and Maintenance</b>	Covers motor cleaning, testing, and preventive maintenance. Also describes basic troubleshooting procedures.	10
<b>Medium-Voltage Terminations/Splices</b>	Offers an overview of the NEC® and cable manufacturers' requirements for medium-voltage terminations and splices.	10
<b>Special Locations</b>	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.	20
<b>Fundamentals of Crew Leadership</b>		20
	<b>Total</b>	<b>180</b>