

# Associated Builders and Contractors Electrical Apprenticeship

## CORE CURRICULUM

### Basic Safety

Provides a comprehensive overview of the safety rules and precautions for working on construction jobsites.

### Basic Math

Provides refresher practice in addition, subtraction, multiplication, and division of whole, decimal, and fractional numbers.

### Introduction to Hand Tools

Covers the selection, inspection, use, and maintenance of common hand tools.

### Intro to Power Tools

Covers the selection, inspection, use and maintenance of common power tools.

### Intro to Blueprints

Covers the basic components of blueprints, including title blocks, lines, symbols, and revision symbols.

### Basic Rigging

Covers rigging safety, equipment, and inspections. Includes crane hand signals, common rope knots, and types of derricks and cranes.

## Level 1

### Electrical Safety

Covers safety rules and regulations for electricians. Trainees learn the necessary precautions to take for various electrical hazards found on the job. Also teaches the OSHA mandated lockout/tagout procedure.

### Hand Bending

Provides an introduction to conduit bending and installation. Covers the techniques for using hand-operated and step conduit benders, cutting, reaming, and threading conduit.

### Fasteners and Anchors

Covers the hardware and systems used by an electrician to mount and support boxes, receptacles, and other electrical components. Trainees learn the various types of anchors and supports, their applications, and how to install them safely.

### Electrical Theory I

Offers a general introduction to the electrical concepts used in Ohm's Law applied to DC series circuits. Topics include atomic theory, electromotive force, resistance and electric power equations.

### Electrical Theory II

Introduces series, parallel and series-parallel circuits. Covers resistive circuits, Kirchoff's Voltage and Current Laws, and circuit analysis.

### Electrical Test Equipment

Focuses on proper selection, inspection, use, and maintenance of common electrical test equipment. Trainees get to practice using many of the instruments while learning the appropriate test procedures and safety rules.

### Introduction to the NEC

Provides a navigational road map for using the NEC. Trainees are introduced to the layout of the NEC and the types of information found within the code book. Trainees are able to practice finding information using an easy-to-follow procedure.

### Raceways, Boxes, and Fittings

Introduces the types and applications of raceways, wireways, and ducts. The appropriate NEC requirements are stressed.

### Conductors

Focuses on the types and applications of conductors and covers proper wiring techniques. The appropriate NEC requirements are stressed.

### Intro to Electrical Blueprints

Focuses on electrical prints, drawings, and symbols. Trainees learn the types of information they can find on schematics, one-lines, and wiring diagrams.

### Electrical Wiring: Commercial and Industrial

Covers the electrical devices and wiring techniques common to commercial and industrial construction maintenance. Mounting devices, making splices, and installing receptacles are all practiced.

### Electrical Wiring: Residential

Covers the electrical devices and wiring techniques that are common to residential construction and maintenance. Trainees also practice making service calculations.

## Level 2

### Alternating Current

Focuses on forces that are characteristic of alternating-current systems and the application of Ohm's Law to AC circuits.

### Motors: Theory and Application

Covers both AC and DC motors including the main parts, circuits, and connections.

### Grounding

Focuses on the purpose of grounding and bonding electrical systems, including NEC regulations.

### Conduit Bending

Covers all types of bends in all sizes of conduit up to 6 inches. The main focus is places on mechanical, hydraulic and electrical benders.

### Boxes and Fittings

An NEC-driven module that explains how to select and size outlet boxes, pull boxes, and junction boxes.

### Conductor Installations

Covers the transportation, storage, and set-up of cable reels, methods of rigging, and procedures for complete cable pulls in raceways and cable trays.

### Cable Tray

Focuses on NEMA and NEC installation requirements for the cable tray, including modifications and cable installations.

### Conductor Terminations and Splices

Describes methods of terminating and splicing conductors of all types and sizes, including the preparation and taping of conductors.

### Installation of Electric Services

Covers methods and techniques for both single and three-phase services, including metering equipment and NEC regulations.

### Circuit Breakers and Fuses

Describes fuses and circuit breakers along with their practical application. Short-circuit calculation is also covered.

### Contactors and Relays

Gives basic descriptions of various types of contactors and relays, along with their practical applications.

### Electric Lighting

Covers the principles of illumination and the various light sources available. Practical applications are given for residential, commercial, and industrial installations.

## Level 3

### Load Calculations – Branch Circuits

Introduces the industry standards for electrical work, including branch circuits, rating and derating, and various types of residential and commercial electrical loads.

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## (Level 3 Continued)

### Conductor Selection and Calculations

Covers the types of conductors used in wiring systems, including insulation, current-carrying capacity, and temperature ratings.

### Overcurrent Protection

Stresses the use of fuses for overcurrent protection in all types of electrical systems.

### Raceway, Box and Fitting Fill Requirements

Covers the number of conductors allowed in raceways, boxes and fittings.

### Wiring Devices

Covers popular receptacles and switches, and takes an in-depth look at safety switches and other wiring devices.

### Distribution Equipment

Explains distribution equipment, including grounding, switchboard and ground fault maintenance, transformers, and electrical drawing identification.

### Distribution System Transformers

Transformer types, construction, connections, protection, and grounding are the main topics of this module, along with capacitors and rectifiers.

### Basic Lighting

Topics include a study of various lighting catalogs and residential outdoor lighting.

### Motor Calculations

Covers single and multi-motor calculations to enable the trainee to size conductors, overcurrent protection, and overload protection for motor applications.

### Motor Maintenance, Part I

Covers proper maintenance of motors in use and in storage. Includes a trouble-shooting and motor identification guide.

### Motor Controls

Begins with simple cord-and-plug motor controllers and continues through conventional controllers up to highly sophisticated electronic controls.

### Electricity in HVAC Systems

Covers the basic principles of refrigeration and air conditioning, NEC requirements, compressors, and HVAC control wiring and troubleshooting.

## Hazardous Locations

All classes of hazardous locations are covered, including seals, components, and equipment approved for use in various hazardous locations.

## Level 4

### Load Calculations – Feeder and Services

Topics include basic calculation procedures and calculations for residential, commercial, and farming applications.

### Commercial/Industrial Lighting

Covers landscape lighting and trolley lighting circuits.

### Specialty Lighting

Introduces the trainee to cord-connected lamp holders and fixtures, and lighting standards for parking lots.

### Standby and Emergency Systems

NEC installation requirements for electric generators and storage batteries are fully explained.

### Basic Electronic Theory

Explains the function and operation of basic electronic devices, including semiconductors, diodes, rectifiers, and transistors.

### Fire Alarm System

Covers fire alarm control units, Digital Alarm Communicator Systems (DACS), installation wiring for alarm initiating and notification devices, and alarm system maintenance.

### Specialty Transformers

Covers potential transformers, current transformers, constant-current and shielded transformers. Calculating size and installation methods are covered.

### Advanced Controls

Explains operating principles of solid state controls along with their practical applications. Motor braking, jogging, plugging, and safety interlocks are also covered.

### HVAC Controls

Focuses on advanced HVAC controls in utilizing solid-state circuitry.

### Welding Machines

After a brief introduction explaining how welding machines operate, this module covers the types of electrical welders and their characteristics.

## Heating Tracing and Freeze Protection

Thoroughly covers detailed installation techniques as well as resistance heating elements, impedance heating, and skin effect heating.

## Motor Maintenance, Part 2

Covers cleaning, vibrations testing, magnetic centering, testing, and metering power factors, testing running temperatures, and similar maintenance techniques.

## High Voltage Terminators / Splices

Offers an overview of the NEC and cable manufacturers' requirements for high voltage terminators and splices.

## Level 5

### Advanced Topics

### Exam Preparation

### 1999 NEC Handbook