

2014 NATIONAL ELECTRICAL CODE® (NEC) & ELECTRICAL SAFETY WITH PRACTICAL APPLICATIONS WORKSHOP

Whether new to the NEC or a seasoned electrician or engineer, this class is all about learning how to use the Code. This class covers the practical side of the code along with the safety practices needed.

Day 1 - NFPA 70E Arc Flash Electrical Safety
Day 2-4 - An intensive dive into the 2014 NEC
Day 5 - Practical Applications Workshop

Our new practical applications and calculations requirements brings the workshop courses together, and relates to Article 250 and other articles of the National Electrical Code® (NEC) as well as NFPA 70E. The practical applications and calculations section uses the code to perform calculations and solve common residential and industrial application issues, detect size conductors using tables, determine overcurrent protection (fuses and breakers), and set motor overloads, size starters, controllers, size disconnects, and conduits. You will also covers how to maintain your electrical systems with the correct grounding and bonding techniques.



CLASS FORMAT:

Lecture

STANDARD CLASS SIZE:

NTT recommends a class of no more than 35 participants to obtain the best results.

NTT TO PROVIDE:

- 5-day (40 contact hours) of on-site instruction
- Textbooks
- Classroom consumables
- Completion certificates
- Shipping and instructor travel logistics

CLIENT PROVIDES:

- Classroom of 500 square feet or greater
- Projection screen, white board and/or flip chart(s)

WHO SHOULD ATTEND:

- Electricians
- Mechanics
- Apprentice and experienced HVAC technicians
- Supervisors working on or who oversee employees working on 50V or greater equipment
- Maintenance Technicians
- Fire Alarm Technicians
- Plant & facility maintenance technicians
- Building engineers
- Stationary engineers
- Safety directors

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COURSE AGENDA - DAY 1

NFPA 70E ELECTRICAL SAFETY AWARENESS

- Hazards of electricity (shock, arc, blast)
- Approach boundaries (shock and flash)
- Qualified vs. Unqualified vs. Licensed
- Review of safe related work practices. (including test meters, overcurrent protection)
- Risk categories using the tables in the NFPA 70E
- PPE with Arc Flash Protection (ATPV or flame retardant)

COURSE AGENDA - DAYS 2-4

2014 NEC

APPLYING THE NEC ARTICLE 90

- NEC process and definitions
- Equipment examination
- Code change introduction
- Metric and standard units

ELECTRICAL INSTALLATIONS ARTICLE 110

- Approval
- Conductors
- Equipment
- Mechanical installations
- Mounting and cooling
- Electrical connections
- Arc flash protection
- Spaces about electrical equipment

BRANCH CIRCUITS AND FEEDERS ARTICLE 210

- Branch circuits
 - Review of Code changes
 - Branch circuit ratings
 - Multiwire branch circuits
 - Identification of ungrounded conductors
 - Color code for branch-circuit grounded conductors
 - Color code for branch-circuit equipment grounding conductors
- Receptacle and cord connectors
 - Replacing receptacles
 - Review of code changes
 - Dwelling units
 - Bathrooms
 - Garages and accessory buildings
- Buildings
 - Other than dwelling units
 - Required branch circuits
- Branch-circuit ratings 210.19
 - Review of code changes
 - Minimum size conductors
 - Overcurrent protection
- Feeders
 - Review of code changes
 - Minimum rating and size
 - Feeders with common neutral
 - Identifying high-leg in Delta 4-wire systems
 - Ground-fault protection of equipment

SERVICES ARTICLE 230

- Review of Code changes
- Definitions
- Service limitations
 - Number of services
 - Conductors—outside of buildings

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- Service raceways and seals
- Clearance from openings
- Overhead service-drop conductors
- Underground service-lateral conductors
- Service-entrance conductors
- Service Equipment
 - AIC rating
 - Identification
 - Disconnecting means
 - Ground-fault protection of equipment

CONDUCTORS AND OVERCURRENT PROTECTION ARTICLE 240

- Conductors
- Ampacity
 - Insulation ratings
 - Ambient temperature
- Overcurrent protection
 - Review of code changes
 - Protection of conductors
 - Ampere ratings
- Location of overcurrent protection devices
 - Underground conductor
 - Grounded conductor
 - Circuit location
- Overcurrent Devices
 - Plug and cartridge fuses
 - Circuit breakers
 - CB markings

GROUNDING & BONDING ARTICLE 250

- Review of Code changes
- Grounding terminology
- Grounding systems
- Grounding equipment and enclosures
- Grounding means
- Bonding
 - Services
 - Bonding over 250 volts

- Main and equipment bonding jumpers
- Grounding Electrode System—Part III
- Equipment Grounding Conductors

WIRING METHODS ARTICLE 300

- Wiring Methods
 - Conductors of same circuit
 - Conductors of different systems
 - Protection from physical damage
 - Underground installations
 - Protection against corrosion
 - Mechanical continuity of raceways and cables
 - Length of conductors at outlet box
 - Boxes, conduit bodies, or fittings required
- Supporting conductors in a vertical raceway
- Preventing heating effects of inductive current in metallic parts
- Securing integrity of fire-resistant-rated walls
- Preventing spread of toxic fumes in an air-handling system

WIRING MATERIALS—RACEWAYS AND BOXES ARTICLE 300

- Review of Code changes
- Raceway systems
 - Rigid metal and nonmetallic conduit
 - Electrical metallic tubing
 - Flexible metal conduit
 - Liquid-tight flexible metal and nonmetallic conduit
- Cable Assemblies
 - Metal-clad cable
 - Armored cable
 - Nonmetallic-sheathed cable
- Other wiring systems
 - Cable Tray Systems
 - Wireways
 - Busways
 - Auxiliary gutters
- Boxes, Conduit Bodies, and Fittings

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WIRING MATERIALS

- Review of Code changes
- Switches Article 404
- Switchboards and panelboards

ARTICLE 408

- Panelboards
 - Number of overcurrent devices on one panelboard
 - Grounding of panelboards

EQUIPMENT FOR GENERAL USE—ARTICLE 400

- Review of Code changes
- Flexible Cords and Flexible Cables
- Luminaries Article 410
 - Luminaries locations
 - Flush and recessed fixtures
 - Electric-discharge equipment 1000 volts or less
 - Lighting track
- Receptacles, cord connectors and attachment plugs
 - Tamper resistant receptacles
 - Grounding and non-grounding receptacles
 - Isolated-ground receptacles
 - Hospital-grade receptacles
 - GFCI-type receptacles
- Appliances Article 422
 - Installation requirements
 - Disconnecting means
 - Safety provisions
 - Markings

MOTORS, GENERATORS, A/C & REFRIGERATION, AND FIRE PUMPS

- Motors Article 430
 - Review of Code changes
 - Ampacity and motor ratings
 - Markings on motors and multimotor equipment and controllers

- Branch circuit—single motor
- Motor control circuits and centers
- Disconnecting means
- A/C and Refrigeration Equipment Article 440
 - Single equipment
 - Disconnecting means
 - Branch-circuit fuses or circuit breakers
 - Room A/Cs—Part VII
- Fire Pumps Article 695
 - Power source to electric-motor driven fire pumps

TRANSFORMERS ARTICLE 450

- Transformer construction and types
- Transformer installation
- Transformer vaults

SPECIAL LOCATIONS ARTICLE 500 AND 600

- Electrified truck parking spaces

ARTICLE 626

- Review of Code changes
- Hazardous locations Article 500
 - Group classifications
 - Wiring methods
 - Conduit seals
 - Motors and generators
 - Grounding
- Intrinsically safe systems
- Service and Repair Garages Article 511
- Health care facilities
- Places of assembly

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COURSE AGENDA - DAY 5

NEC® PRACTICAL APPLICATIONS AND CALCULATIONS



- Use code to perform calculations
- Solve common residential/industrial applications
- Size services
- Service and feeder conductors including all required Grounding and Bonding conductors
- Size conductors using tables
- Determine overcurrent protection (fuses and breakers)
- Motor overloads
- Size starters
- Controllers
- Size disconnects
- Conduits