Rick Chambers Course Descriptions

2023 National Electrical Code Update

This 6-hour course covers the significant changes in the latest edition of the NEC. These changes include seven new articles dealing with Branch Circuits, Feeders, and Services Over 1000V ac or 1500V dc (235), Overcurrent Protection for Systems Rated Over 1000V ac, 1500V dc (245), Insulated Bus Pipe (IBP)/Tubular Covered Conductors (TCC) Systems (369), Flexible Bus Systems (371), Cables for Power-Limited Circuits, Fault-Managed Power Circuits, and Optical Fiber (722), Class 1 Power-Limited Circuits and Class 1 Power-Limited Remote-Control and Signaling Circuits (724), and Class 4 Fault-Managed Power Systems (726). Also covered will be the major changes in the introduction and all nine chapters of the codebook.

Participants must have a copy of the 2023 NEC, highlighters, notebook and pencils.

Materials/Visual Aids

Powerpoint presentation created by the instructor
Handouts: All Errata and TIAs available the week of the class
Any amendments adopted by the State of Iowa
Summary of the most critical changes

Agricultural Wiring – Article 547

This 2-hour class covers the National Electrical Code requirements for agricultural buildings, including: wiring methods permitted; enclosure and box rules; protection against dust, moisture, and corrosion; GFCI protection; motors and luminaires; supply to buildings from a distribution point; grounding and bonding; conductor sizing; disconnecting means; overcurrent protection; installation of distribution points; and the equipotential bonding plane.

Participants will need to bring a copy of the current NEC, highlighters, calculator, notebook and pencils.

Materials/Visual Aids

Powerpoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation
Utility company grain bin clearances
Article on stray voltage

Ampacity Calculations

This 2-hour interactive class covers ampacity calculations for conductors in residential, commercial, and industrial applications, including derating for ambient temperature, number of conductors in a raceway or cable, and installations on rooftops.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

PowerPoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation
Practice problems and solutions

Arc Flash Training, NFPA 70E

The purpose of this 4-hour class is:
1. To introduce personnel to the electrical hazards of shock, arc flash and arc blast.
2. To explain the requirements of *NFPA 70E: Standard for Electrical Safety in the Workplace* specifically related to personnel safety.
3. To demonstrate lockout/tagout procedures that are required in order to put equipment in an electrically safe working condition.
4. To describe the types and levels of personal protective equipment (PPE) that may be necessary for work on live parts, and to show how to select the PPE that is required for the job.

Materials/Visual Aids

Visual Aids: PowerPoint presentation created by the instructor
Textbook: *Standard for Electrical Safety in the Workplace* (NFPA 70E, current Edition)
Videos: Arc flash testing produced by Westex
Glove testing produced by Salisbury
Test Before Touch produced by Fluke
Handouts: Printout of the PowerPoint presentation
Sample Energized Electrical Work Permit
Tables showing approach boundaries, task hazard categories and PPE requirements
Materials for hands-on training:
Fused disconnect to test for absence of voltage and blown fuses
Several types of test instruments
Sample current limiting fuses
Arc-rated hood, coverall, gloves, and voltage rated tools

Basic Motor Controls

This 8-hour course introduces the student to motor control schematic symbols, ladder diagrams, control devices, relays, contactors, and starters. Students will learn basic control circuits, including: pilot control, single and multiple start-stop, and jogging circuits by wiring circuits in a laboratory setting using actual control devices.

Participants must bring: notebook, pencils, safety glasses, multi-meter, wire strippers, screwdrivers, and long nosed pliers.

Materials/Visual Aids

Materials for hands-on training:
Several brands of motor starters, overloads, relays, and control devices
Conductors and pilot lights
Visual Aid: PowerPoint presentations created by the instructor
Handouts: Printouts of PowerPoint presentations
Common control device drawings and symbols
Common numbering systems
Common control circuit diagrams
Practice pages for drawing control circuits

Box Sizing Calculations

This 2-hour interactive class covers box sizing calculations for residential, commercial, and industrial applications, including metallic and nonmetallic boxes, junction and pull boxes, and conduit bodies.

Participants must have a copy of current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aid: PowerPoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation
Practice problems with solutions

Commercial Service Calculations

This 4-hour interactive class covers calculations for commercial services, including retail stores, office buildings, schools and places of worship, hotels and motels, restaurants, farms, health care facilities, and boatyards and marinas. Also covered are neutral load calculations and optional methods.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils

Materials/Visual Aids

PowerPoint created by the instructor
Handouts: Printout of the PowerPoint presentation
Practice problems with solutions

Intermediate Motor Controls

This 8-hour course introduces the student to some of the more complex motor control circuits. Students will learn interlocking, time delay, reversing, latching, reduced voltage starting, and braking circuits by wiring circuits in a laboratory setting using actual control devices.

Participants must bring: notebook, pencils, safety glasses, multi-meter, wire strippers, screwdrivers, and long nosed pliers.

Materials/Visual Aids

Materials for hands-on training:
Many brands of motor starters, overloads, contactors, relays, control devices, and pilot lights
Handouts: Motor interlocking circuit diagrams
Relay numbering systems
Time-delay relay diagrams
Reversing circuit diagrams
Latching circuit diagrams
Reduced voltage starting circuits
Braking circuit diagrams

Motor Calculations

This 2-hour interactive class covers calculations for motor disconnects, overloads, branch-circuit conductors, branch-circuit short-circuit and ground-fault protection, feeder conductors, and feeder short-circuit and ground-fault protection.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aids: PowerPoint presentation created by the instructor
Handouts: Motor calculation guidelines
Printout of the PowerPoint presentation

Overcurrent Protection

This 2-hour interactive class covers calculations for overcurrent protection for conductors and equipment in residential, commercial, and industrial services, feeders, and branch circuits. Also covered are the rules for feeder taps and transformer secondary conductors.

Participants must have a copy of the current edition of NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aids: PowerPoint presentation created by the instructor
Samples of many types of breakers and fuses
Handouts: Printout of PowerPoint presentation

Raceway Sizing Calculations

This 2-hour interactive class covers raceway sizing calculations for residential, commercial, and industrial applications, including most conductor and raceway types and nipples.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aid: PowerPoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation

Transformer Calculations

This 2-hour interactive class covers calculations for correctly sizing isolation and autotransformers, primary and secondary conductors, and primary and secondary overcurrent protection for single-phase and three-phase transformers of all sizes. You will also learn how to adjust input values for transformers with efficiencies less that 100%.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aid: PowerPoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation
Transformer formulas
Practice problems with solutions

Voltage Drop Calculations

This 2-hour interactive class covers a practical method to compute voltage drop in single-phase and three-phase AC and DC circuits, the need for these calculations, how to use your calculator most effectively, how to solve voltage drop problems in the electrician license exam, and how to correctly size conductors for efficient operation in residential, commercial, and industrial applications. Also, covered are load center length calculations where the load is not concentrated at the end of the conductor.

Participants must have a copy of the current NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aid: PowerPoint presentation created by the instructor
Handouts: Printout of the PowerPoint presentation
Voltage drop formulas

Grounding & Bonding

This 6-hour interactive course is designed for those who wish to better understand grounding and bonding of electrical systems and equipment. The PowerPoint presentation has been completely revised to coordinate with the 2023 NEC. The class will explain the fundamentals and practice of grounding and bonding in easily understood language using hundreds of color illustrations and photos.

Participants must have a copy of the 2023 NEC, calculator, highlighters, notebook, and pencils.

Materials/Visual Aids

Visual Aids: Powerpoint presentation created by the instructor

Handouts: Printout of the PowerPoint presentation
Solutions for the practice questions in the presentation

Electrician License Exam Prep

This 16-hour course includes a short review of electrical theory, covers the eight basic types of calculations you need to know for the Iowa Class A Journeyman and Master license exams, how to use the code book to find answers in a hurry, practical test-taking techniques and hundreds of practice exam questions.

Participants must have a copy of the 2023 National Electrical Code, highlighters, calculator, notebook and pencils.

Materials/Visual Aids

Recommended materials:
Journeyman or Master Electrician Exam Questions and Answers, by Tom Henry
Calculations for the Electricians Exam, by Tom Henry
Ultimate Codebook from Tom Henry or
Code Tabs from Tom Henry
800-642-2633 or www.code-electrical.com

Visual Aids: Presentation containing tips, theory review, and examples of each type of calculation
Two complete 80-question journeyman exams
One complete 80-question master exam

Handouts: Class outline
Copy of the PowerPoint presentation
Electrical theory review
Ten practice theory tests with answers
Calculator drill worksheet with solutions
A 5-page list of the most important requirements for residential wiring
A 6-page list of the most important requirements for commercial/industrial wiring
30 practice calculation questions and answers on areas not covered in the texts
Hundreds of additional practice questions and answers for journeymen and masters

Top 2023 Residential Changes

This 2-hour class covers the top changes in the 2023 National Electrical Code requirements pertaining to residential wiring, beginning with definitions and continuing through GFCI requirements, kitchen receptacle locations, lighting control, new requirements for surge protection, calculations, outdoor disconnect for feeders, raceway sealing, grounding and bonding connections, switch and receptacle connections, panelboard labeling and replacement, luminaires, appliances, ac disconnects, and outdoor generators.

Participants must have a copy of the 2023 National Electrical Code, highlighters, notebook and pencils.

Materials/Visual Aids

Powerpoint presentation created by the instructor

Handouts: Any Errata available the week of the class
Any amendments adopted by the State of Iowa
Significant Changes in the 2023 NEC pertaining to residential wiring