



ELECTRICIAN TECHNICIAN COURSE OUTLINE

90 to 130 Hours

- **30 Instructional Hours**
- **60 Self-Study Hours**
- **40 Externship Hours (when offered with externship)**

Duration 3 or 6 months • Mentor Supported

No Prerequisites Required

Certificate in Electrician Theory

This comprehensive, knowledge-based Electrical Course teaches all aspects of the electrical trade. Students will study everything from electrical theory and the National Electrical Code® to blueprint reading, residential wiring, electronic control systems, motors and much more. Foundational principles of electricity, such as electric current, Ohm's Law, and circuits are explained in detail. Students learn the tools of the trade, and critical safety procedures. How to install the residential electrical components are demonstrated in detail, including such items as device boxes, raceways and fittings, fasteners and anchors, conductors and cables and more. The course also includes electrical troubleshooting and repair. Students study and complete the course at a pace they control. Students must study with sufficient retention of the knowledge to pass their exams with a score of 80% or higher.

EQUIPMENT AND MATERIALS USED IN THIS COURSE

An internet-capable computer, internet connection, web browser, textbook, online examinations and information.

CURRICULUM OUTLINE

Note: This curriculum references only key instructional content and is not inclusive of the entire curriculum. For the complete curriculum, request the Course Syllabus.

TESTING AND CERTIFICATE REQUIREMENTS

After completing the eLearning course the student will take an online examination to test their knowledge. Also, for each of the assigned chapters in the Electrical textbook complete an end-of-chapter quiz. Quizzes are optional study tools to support passing your final exam. Exams are online, not timed, and are open book. When you pass your final exam with a score of 80% or higher, you will receive an Electrician Theory Certificate.

UNIT 1

- Safety
- Hand tools
- Power tools
- Specialized tools
- The National Electric Code
- Electrical boxes (device boxes)
- Plastic boxes
- Metal boxes
- Inserting conduit
- Cable clamps
- Bending conduit

UNIT 3

- Raceways
- FMC in NEC
- Liquid Tight Flexible Conduit (LFMC)
- PVC
- LFNC: 356
- Conduits
- Raceways
- Fasteners, anchors, bolts
- Drilling through studs
- Running wire

UNIT 5

- Terminating wire
- Wire bends
- Stripping and Crimping wire
- Splicing wires in a J-box
- Terminating wire and switches
- Ground fault circuit interrupter (GFCI)
- Terminals
- Troubleshooting series circuits
- Parallel circuits
- Combination circuits

UNIT 2

- Cutting pipe
- Offset bends
- Measuring conduit
- Parallel offsets
- Laying out the pipe
- Fabricating saddle bends
- Bending conduit for 3-saddle bend
- More benders
- Cutting conduit
- Threading conduit

UNIT 4

- Installation on conduit, boxes, fitting, wiring
- Conductors
- Cables
- Conductor selection
- Wire sizes
- Insulation
- Color coding
- Installing wire

UNIT 6

- Atomic Theory
- Bump theory for conductors
- Insulators
- Summary
- General electrical theory
- Ohm's Law
- Series circuits

UNIT 7

- Magnetism
- Electro magnets
- Induction
- Magnetic devices
- Electric motor devices
- Transformers
- A.C. Theory
- Alternator
- AC vs DC
- Converting AC to DC
- Diodes and rectifiers

UNIT 9

- Conductor: sizing wire
- Wire resistance single phase
- Wire resistance three phase
- Taps
- Parallel conductors
- Insulation testing
- Ampacity
- Service Equipment
- NEC requirements for dwelling units
- GFCI receptacles
- Assigning circuits
- Location of installation of service equipment

UNIT 11

- Control systems and fundamental concepts relays
- Motor controller
- Ladder diagram
- Programmable Logic Controller (PLC)
- Electric motors
- DC Motors
- Universal motors
- Stepping motors
- Single-phase-AC and 3-phase motors

UNIT 8

- Inductors
- Lenz's Law
- Impedance
- Inductive phase shift
- Capacitors
- RC circuits
- Farads
- Capacitors in series and parallel
- Capacitive reactance
- Voltage and current phase relationship

UNIT 10

- Service panel set up
- Load calculation
- Sizing the wire
- Grounding systems
- Over current devices
- AFCI
- Multi-wire circuits
- Building sequence
- Sizing feeder wire
- Wiring