

Electrical Technology



Program / Hours: CIP 46.0399 – 2 Year Half Day Program

Course Description: An instructional program that prepares individuals to apply technical knowledge and skills necessary to install, operate, maintain and repair electrically energized residential, commercial and industrial systems, and DC and AC motors, controls and electrical distribution panels. Instruction emphasizes practical application of circuit diagrams and use of electrical codes and includes blueprint reading, sketching and other subjects essential for employment in the electrical occupations. Reading and interpretation of commercial and residential construction wiring codes and specifications, installation and maintenance of wiring, service and distribution networks within large construction complexes are also critical components of the program.

Learning Activities / Modes of Assessment:

- Small Group
- Large Group
- Independent Work
- One-on-One
- Classwork Activities
- Presentations
- Research Projects
- Research Papers
- Technology Use
- Tests and Quizzes

Individual Resources:

- Online Resources
- PowerPoint Presentations
- Computer Applications
- Conduit bending Equipment and Tools

Year / MP	Task #	K - Know	U - Understand	D - Do
Yr 1 MP 1	101	Identify career: role, function, obligations, and limitations of the dental care provider as a member of the dental team.	Understand roles and limitations of dental team members.	Create a visual diagram of a dental team with roles and responsibilities.
Yr 1 MP 1	101	Inspect and use personal protective equipment.	PPE is critical for protecting electricians from hazards.	Inspect and properly wear safety glasses, gloves, hard hat.
Yr 1 MP 1	102	Identify causes of job site accidents.	Recognize unsafe practices to prevent accidents.	List common jobsite hazards and explain prevention.
Yr 1 MP 1	105	Properly don fall protection.	Fall protection is required when working at heights.	Demonstrate putting on a harness.
Yr 1 MP 1	106	Identify four classes of fire extinguishers.	Fire extinguishers are specific to different fire types.	Identify correct extinguisher for electrical fires.
Yr 1 MP1	107	Confirm circuits are de-energized before working on them.	Always test before touch to ensure safety.	Demonstrate testing a circuit for power.
Yr 1 MP 1	108	Perform lockout/tagout.	Lockout/tagout ensures equipment remains de-energized.	Apply a lockout/tagout device.
Yr 1 MP 1	109	Inspect and use ladders.	Ladder safety prevents falls and injuries.	Set up and climb a ladder correctly.
Yr 1 MP 1	110	Complete jobsite hazard analysis form.	Hazard analysis reduces risk before work begins.	Fill out a hazard analysis for a mock site.
Yr 1 MP 1	111	Identify arc-flash hazards and protection (NFPA70E).	Arc-flash is a severe electrical hazard requiring PPE.	Identify required arc-flash PPE for a scenario.
Yr 1 MP 2	201	Use screwdrivers.	Screwdrivers are used for fastening electrical components.	Use a flathead and Phillips screwdriver.
Yr 1 MP 2	202	Use pliers.	Pliers grip, bend, and cut wire.	Use lineman's pliers to cut wire.
Yr 1 MP 2	203	Use a keyhole/drywall saw.	Keyhole saws cut small openings.	Cut an outlet opening in drywall.
Yr 1 MP 2	204	Use a hydraulic knockout/punch tool.	Knockouts create conduit entry holes.	Punch conduit hole in a panel.
Yr 1 MP 2	205	Use a tape measure.	Accurate measurement ensures proper layout.	Measure conduit length accurately.
Yr 1 MP 2	206	Use wire strippers.	Stripping insulation prepares wire for connection.	Strip insulation from a conductor.
Yr 1 MP 2	207	Use wire cutters.	Wire cutters provide clean cuts.	Cut copper wire cleanly.
Yr 1 MP 2	208	Use a utility knife.	Utility knives cut insulation and materials.	Cut cable sheathing safely.

Yr 1 MP 2	209	Use a torpedo level.	Level ensures straight and accurate work.	Level conduit runs.
Yr 1 MP 2	210	Use a hammer.	Hammers are used to secure fasteners.	Hammer fasteners for conduit straps.
Yr 1 MP 2	211	Use a conduit reamer.	Reamers smooth sharp edges of cut conduit.	Ream cut EMT pipe.
Yr 1 MP 2	212	Use a hacksaw.	Hacksaws cut conduit and hardware.	Cut EMT with hacksaw.
Yr 1 MP 2	213	Use MC Cable splitter (roto-split).	Splitter safely cuts MC cable.	Strip MC cable with splitter.
Yr 1 MP 2	214	Use adjustable or non-adjustable wrenches.	Wrenches tighten and loosen fittings.	Tighten conduit fittings.
Yr 1 MP 2	215	Use ratchet and sockets.	Sockets fit bolts and nuts quickly.	Tighten bolts with socket set.
Yr 1 MP 2	216	Use nut drivers.	Nut drivers tighten small fasteners.	Use nut driver to secure cover plate.
Yr 1 MP 3	302	Use a hammer drill.	Hammer drills drill into masonry.	Drill a hole into concrete.
Yr 1 MP 3	303	Use a reciprocating saw.	Recip saws cut wood/metal quickly.	Cut EMT with reciprocating saw.
Yr 1 MP 3	304	Use a portable band saw.	Band saws cut conduit cleanly.	Cut conduit with band saw.
Yr 1 MP 3	306	Use a drill.	Drills are versatile tools.	Drill holes for fasteners.
Yr 1 MP 3	310	Use an oscillating multipurpose tool.	Oscillating tools cut in tight spaces.	Cut outlet box opening in drywall.
Yr 1 MP 3	311	Use impact driver.	Impact drivers fasten screws and bolts.	Drive screws with impact driver.
Yr 1 MP 4	401	Identify types of blueprint plans.	Blueprints show construction details.	Identify plan types in a set.
Yr 1 MP 4	402	Identify blueprint symbols.	Symbols represent electrical components.	Identify outlet/switch symbols.
Yr 1 MP 4	403	Interpret blueprint plans.	Reading prints guides installation.	Trace circuit on a print.
Yr 1 MP 4	405	Develop electrical details on a blueprint.	Details clarify installation methods.	Add detail to a plan.
Yr 1 MP 4	406	Use measuring tool to scale.	Scale allows accurate dimensions.	Scale room dimensions from a print.
Yr 2 MP 1	501	Identify, select, and install anchors and supports.	Anchors/supports secure electrical systems.	Install anchors for conduit mounting.
Yr 2 MP 1	601	Install non-metallic (NM) cable.	NM is common in residential wiring.	Install Romex cable to an outlet.
Yr 2 MP 1	602	Install metal-clad cable (MC).	MC cable protects against damage.	Run MC cable in lab wall.
Yr 2 MP 1	605	Terminate a coaxial cable.	Proper termination ensures signal quality.	Terminate coax cable with connector.
Yr 2 MP 1	609	Identify telecommunications cable types.	Telecom cables carry voice/data.	Identify Cat5, Cat6 cables.

Yr 2 MP 1	610	Terminate a RJ45 connector.	RJ45 connectors terminate data cable.	Terminate Ethernet cable.
Yr 2 MP 1	611	Install SE cable.	SE cable supplies power to panels.	Install SE cable into a service panel.
Yr 2 MP 1	612	Terminate and splice conductors.	Proper splices ensure safe circuits.	Splice wires in a junction box.
Yr 2 MP 2	701	Install a duplex receptacle.	Receptacles provide power access.	Install outlet in a box.
Yr 2 MP 2	702	Install a single pole switch.	Switches control circuits.	Install light switch.
Yr 2 MP 2	703	Install a 3-way switch.	3-way switches control lights from 2 locations.	Install 3-way switch circuit.
Yr 2 MP 2	704	Install a 4-way switch.	4-way switches allow control from 3+ locations.	Install 4-way switch circuit.
Yr 2 MP 2	705	Install a split-wired duplex receptacle.	Split receptacles allow multi-circuit use.	Wire split receptacle.
Yr 2 MP 2	706	Install a GFCI receptacle.	GFCIs protect from ground faults.	Install GFCI outlet.
Yr 2 MP 2	707	Install an AFCI.	AFCIs protect from arc faults.	Install AFCI receptacle.
Yr 2 MP 2	708	Install a time control switch.	Timers automate circuits.	Install timer switch.
Yr 2 MP 2	709	Install a range receptacle.	Range receptacles power stoves.	Install 240V receptacle.
Yr 2 MP 2	710	Install a dryer receptacle.	Dryer receptacles power dryers.	Install dryer outlet.
Yr 2 MP 2	711	Install various branch circuits.	Branch circuits supply different loads.	Wire a branch circuit.
Yr 2 MP 2	712	Install connected/smart devices.	Smart devices add automation.	Install a smart outlet.
Yr 2 MP 3	801	Install surface-mounted lighting fixture.	Surface lights provide illumination.	Install ceiling light.
Yr 2 MP 3	802	Install recessed lighting fixtures.	Recessed lights fit flush with ceiling.	Install can lights.
Yr 2 MP 3	803	Install a ceiling fan.	Fans circulate air and provide light.	Install ceiling fan.
Yr 2 MP 3	804	Install special purpose lighting.	Special lights meet unique needs.	Install floodlight.
Yr 2 MP 3	805	Identify IC and non-IC recessed lighting fixtures.	IC rated fixtures prevent overheating.	Identify recessed fixture types.
Yr 2 MP 3	901	Install Electrical Metallic Tubing (EMT).	EMT is a common conduit type.	Install EMT between boxes.
Yr 2 MP 3	903	Design a surface raceways system (wiremold).	Surface raceways add circuits neatly.	Design a wiremold layout.
Yr 2 MP 3	904	Install flexible raceway.	Flex conduit is used for movement areas.	Install flex conduit.
Yr 2 MP 3	908	Bend a stub 90°.	Stub bends start conduit runs.	Bend a stub 90 with bender.

Yr 2 MP 3	909	Bend an offset.	Offsets align conduit to boxes.	Bend offset in conduit.
Yr 2 MP 3	910	Bend a back to back 90°.	Back-to-back bends change conduit direction.	Make back-to-back 90s.
Yr 2 MP 3	911	Cut, ream, and deburr raceway systems.	Raceway prep ensures smooth wire pulls.	Cut and ream conduit.
Yr 2 MP 3	912	Install conductors in a raceway system.	Conductors must be pulled correctly.	Pull wires through conduit.
Yr 2 MP 4	100 1	Install a hard-wired smoke detector.	Smoke detectors save lives.	Wire and mount smoke detector.
Yr 2 MP 4	100 2	Install door-bell system.	Doorbells provide entry notification.	Wire a doorbell system.
Yr 2 MP 4	100 3	Trim out electrical devices.	Trimming devices completes installation.	Trim outlets/switches with cover plates.
Yr 2 MP 4	100 4	Install an occupancy sensor.	Sensors automate lighting for efficiency.	Install motion sensor.
Yr 2 MP 4	100 5	Install a photocell.	Photocells control lighting automatically.	Install photocell on exterior light.
Yr 2 MP 4	110 1	Use a multimeter to test a circuit.	Multimeters measure voltage, current, and resistance.	Test voltage in circuit.
Yr 2 MP 4	110 3	Use a plug-in circuit tester.	Plug testers identify wiring issues.	Test outlet wiring.
Yr 2 MP 4	110 4	Use a clamp-on ammeter.	Clamp meters measure current safely.	Measure current on live wire.
Yr 2 MP 4	110 6	Use a circuit tracer.	Circuit tracers identify hidden circuits.	Trace a circuit in wall.
Yr 2 MP 4	110 7	Use a network cable tester.	Cable testers verify connectivity.	Test Ethernet cable.
Yr 2 MP 4	110 8	Apply Ohm's/Watt's law calculations.	Ohm's Law underpins electrical theory.	Solve Ohm's Law problem.
Yr 2 MP 4	120 1	Install an overhead service.	Overhead service connects homes to utility.	Install overhead service drop.
Yr 2 MP 4	120 2	Identify parts of an underground service.	Underground services are buried feeds.	Identify underground service parts.
Yr 2 MP 4	120 9	Identify types of safety disconnect switches.	Disconnects isolate electrical systems.	Identify disconnect switch types.
Yr 2 MP 4	121 0	Terminate a service panel/load center/sub-panel.	Panels distribute power to circuits.	Terminate conductors in service panel.
Yr 2 MP 4	130 1	Identify the purpose of the NEC.	NEC ensures safe electrical practices.	State NEC purpose.
Yr 2 MP 4	130 2	Use Chapter 9 Tables.	Tables provide conduit fill data.	Use Chapter 9 to size conduit.
Yr 2 MP 4	130 3	Use NEC as reference for installations.	NEC is the rulebook for electricians.	Look up NEC requirement for task.
Yr 2 MP 4	130 4	Identify publisher of NEC.	NFPA publishes the NEC.	Identify NEC publisher.

Yr 2 MP 4	130 5	Identify code cycle of NEC.	NEC updates every 3 years.	State code cycle year.
Yr 2 MP 4	140 1	Identify renewable energy sources.	Renewables reduce reliance on fossil fuels.	List renewable energy sources.
Yr 2 MP 4	140 2	Identify procedures for installing a wind turbine system.	Wind turbines generate clean energy.	Explain wind turbine installation steps.
Yr 2 MP 4	140 4	Identify procedures for installing a solar energy system.	Solar systems harness sunlight.	Explain solar panel installation basics.
Yr 2 MP 4	140 7	Evaluate demand and consumption of electrical energy.	Energy audits help efficiency planning.	Evaluate sample energy use data.