



# Electricians

**Cluster Overview:** Planning, managing, and providing scientific research and professional and technical services including laboratory and testing services, and research and development services.

**Career Goal (O\*NET Code):** (47-2111) - Electricians install and maintain electrical systems in homes, businesses, and factories. Electricians read blueprints, which are technical diagrams of electrical systems that show the location of circuits, outlets, and other equipment.

**Student Name:** \_\_\_\_\_

**Grade:** \_\_\_\_\_

**School:** \_\_\_\_\_

## SUGGESTED COURSEWORK

## EXTENDED LEARNING EXPERIENCES

Middle School	8th	HS Courses:	(Local districts may list high school credit courses here)		<p><b>Curricular Experiences***:</b></p> <ul style="list-style-type: none"> <li>BEST Robotics, Inc.</li> <li>FIRST Robotics Competition</li> <li>Project Lead the Way</li> <li>Skills USA</li> <li>Technology Student Association</li> <li>The Infinity Project</li> </ul> <p><b>Career Learning Experiences:</b></p> <ul style="list-style-type: none"> <li>Career Preparation</li> <li>Job Shadowing</li> <li>Internship</li> </ul>	<p><b>Extracurricular Experiences:</b></p> <ul style="list-style-type: none"> <li>Destination ImagiNation</li> <li>International Bridge Building Contest</li> <li>Marine Advanced Technology Education Center</li> <li>National Engineering Design Competition</li> <li>UIL Academic Competitions</li> <li>VEX Robotics Competition</li> </ul> <p><b>Service Learning Experiences:</b></p> <ul style="list-style-type: none"> <li>Campus Service Organizations</li> <li>Community Service Volunteer</li> <li>Peer Mentoring/Peer Tutoring</li> </ul>		
High School	9th	<b>Courses*:</b>	English I Algebra I or Geometry Biology	World Geography Foreign Language I Physical Education or Athletics			<p><b>COLLEGE CREDIT OPPORTUNITIES -- High School</b></p> <p>Students should take Advanced Placement (AP), International Baccalaureate (IB), dual credit, Advanced Technical Credit (ATC), or locally articulated courses (Tech Prep), if possible. List those courses that count for college credit on your campus.</p>	
		<b>Career-Related Electives:</b>	Concepts of Engineering & Technology					
	10th	<b>Courses:</b>	English II Geometry or Algebra II Chemistry	World History Foreign Language II Elective				
		<b>Career-Related Electives:</b>	Engineering Design & Presentation					
	11th	<b>Core Courses:</b>	English III Algebra II or Pre-Calculus Physics	United States History Foreign Language III ** Professional Communications or Speech				
		<b>Career-Related Electives:</b>	Advanced Engineering Design & Presentation					
	12th	<b>Core Courses:</b>	English IV Pre-Calculus or Calculus 4th Science	Government/Economics Elective Elective				
		<b>Career-Related Electives:</b>	Practicum in STEM					
	<p><b>How to Become an Electrician</b></p> <p>Although most electricians learn through a formal apprenticeship, some start out by attending a technical school. Most states require licensure. Most electricians learn their trade in a 4-year apprenticeship.</p>						<p><b>Carrer Options</b> (Sample of reported job titles)</p>	<p><b>Professional Associations:</b></p> <ul style="list-style-type: none"> <li>The International Brotherhood of Electrical Workers and National Electrical Contractors Association's National Joint Apprenticeship Training Committee</li> <li>Associated Builders and Contractors, Inc.</li> <li>Independent Electrical Contractors, Inc.</li> <li>National Association of Home Builders</li> <li>National Center for Construction Education and Research</li> </ul>
Postsecondary		<p><b>Texas Southmost College</b></p> <p>Residential Electrician - Solar Photovoltaic Technology (CERT) Renewable Energy Technologies (AAS)</p>	<p><b>South Texas College</b></p> <p>Electrician Assistant (CERT) Electrician Technology (AAS)</p>	<p><b>Texas State Technical College</b></p>			<ul style="list-style-type: none"> <li>Electrician</li> <li>Maintenance Electrician</li> <li>Journeyman Electrician</li> <li>Inside Wireman</li> <li>Control Electrician</li> <li>Electrician Technician</li> <li>Industrial Technician</li> <li>Journeyman Wireman</li> </ul>	
		<p><b>The University of Texas at Brownsville</b></p>	<p><b>The University of Texas - Pan American</b></p>					

\* Students must meet local & state high school graduation requirements. \*\* Required course for the Distinguished Graduation Plan (in addition to other measures). \*\*\* Based on campus availability. Students may select other elective courses for personal enrichment purposes.

This plan of study serves as a guide, along with other career planning materials, for pursuing a career path and is based on the most recent information as of 2009. All plans meet high school graduation requirements as well as college entrance requirements.



## Electricians

<b>TEA Industry Cluster</b>	STEM
<b>SOC Code</b>	47-2111
<b>Identified by</b>	JFF Software; TWC LMCI; Tech Prep Occupations
<b>Projected Growth (2018)</b>	5 %
<b>BISD Magnet School Available</b>	No

**Source:** Demand Occupations by Cluster, updated June 27, 2012

### Description

#### What Electricians Do

Electricians install and maintain electrical systems in homes, businesses, and factories.

#### Duties

Electricians typically do the following:

- Read blueprints or technical diagrams before doing work
- Install and maintain wiring and lighting systems
- Inspect electrical components, such as transformers and circuit breakers
- Identify electrical problems with a variety of testing devices
- Repair or replace wiring, equipment, or fixtures using hand tools and power tools
- Follow state and local building regulations based on the National Electric Code
- Direct and train workers to install, maintain, or repair electrical wiring or equipment

Almost every building has an electrical system that is installed during construction and maintained after that. Electricians do both the installing and maintaining of electrical systems.

Installing electrical systems is less complicated than maintaining older equipment. This is because it is easier to get to electrical wiring during construction. Maintaining older equipment, however, involves identifying problems and repairing malfunctioning equipment that is sometimes difficult to reach. Electricians doing maintenance work may need to fix or replace outlets, circuit breakers, motors, or robotic control systems.

Electricians read blueprints, which are technical diagrams of electrical systems that show the location of circuits, outlets, and other equipment. They use different types of hand and power tools, such as pipe benders, to run and protect wiring. Other commonly used hand and power tools include screwdrivers, wire strippers, drills, and saws. While troubleshooting, electricians also may use ammeters, voltmeters, and multimeters to find problems and ensure that components are working properly.

Many electricians work independently, but sometimes they collaborate with others. For example, experienced electricians may work with building engineers and architects to help design electrical systems in new construction. Some electricians also may consult with other construction specialists, such as elevator installers and heating and air conditioning workers, to help install or maintain electrical or power systems. At larger companies, electricians are more likely to work as part of a crew; they may direct helpers and apprentices to complete jobs.

The following are examples of occupational specialties:

**Inside electricians** maintain and repair large motors, equipment, and control systems in businesses and factories. They use their knowledge of electrical systems to help these facilities run safely and efficiently. Some also install the wiring for businesses and factories that are being built. To minimize equipment failure, inside electricians often perform scheduled maintenance.

**Residential electricians** install wiring and troubleshoot electrical problems in peoples' homes. Those who work in new-home construction install outlets and provide access to power where needed. Those who work in maintenance and remodeling repair and replace faulty equipment. For example, if a circuit breaker is tripped, electricians determine the reason and fix it.

## Training Opportunities Linked to Those Jobs

(Degree Types and Colleges/Universities)

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### How to Become an Electrician

Although most electricians learn through a formal apprenticeship, some start out by attending a technical school. Most states require licensure.

### Apprenticeship

Most electricians learn their trade in a 4-year apprenticeship. For each year of the program, apprentices must complete at least 144 hours of technical training and 2,000 hours of paid on-the-job training. In the classroom, apprentices learn electrical theory, blueprint reading, mathematics, electrical code requirements, and safety and first-aid practices. They also may receive specialized training related to soldering, communications, fire alarm systems, and elevators. Because of this comprehensive training, those who complete apprenticeship programs qualify to do both construction and maintenance work.

After completing an apprenticeship program, electricians are considered to be journey workers and may perform duties on their own.

Several groups, including unions and contractor associations, sponsor apprenticeship programs. The basic qualifications to enter an apprenticeship program are as follows:

- Minimum age of 18
- High school education or equivalent
- One year of algebra
- Qualifying score on an aptitude test
- Drug free

Some electrical contractors have their own training program. Although most workers enter apprenticeships directly, some start out as helpers.

### Education

Some electricians start out by attending a technical school. Many technical schools offer programs related to safety and basic electrical information. Graduates usually receive credit toward their 4-year apprenticeship.

Electricians may be required to take continuing education courses. These courses usually involve instruction related to safety practices, changes to the electrical code, and training from manufacturers in specific products.

## Licenses

Most states require licensure. Requirements vary by state. Contact your state's licensing agency for more information.

## Important Qualities

**Color vision.** Electricians need good color vision because workers frequently must identify electrical wires by color.

**Critical-thinking skills.** Electricians perform tests and use the results to diagnose problems. For example, when an outlet is not working, they may use a multimeter to check the voltage, amperage, or resistance to determine the best course of action.

**Customer-service skills.** Electricians work with people on a regular basis. As a result, they should be friendly and be able to address customers' questions.

**Managerial skills.** Some electricians must be able to direct others' work as well as plan work schedules. Often, this work includes preparing estimates and other administrative tasks.

**Troubleshooting skills.** Electricians find, diagnose, and repair problems. For example, if a motor stops working, they perform tests to determine the cause of its failure and then, depending on the results, fix or replace the motor.

Texas Southmost College	South Texas College	Texas State Technical College	The University of Texas at Brownsville	The University of Texas - Pan American
<a href="#">Residential Electrician – Solar Photovoltaic Technology (CERT)</a>	<a href="#">Electrician Assistant (CERT)</a>			
<a href="#">Renewable Energy Technologies (AAS)</a>	<a href="#">Electrician Technology (AAS)</a>			

## Local Employers

<a href="#">A &amp; B Electric &amp; Plumbing</a>	<a href="#">Brownsville</a>	<a href="#">Kelteck Heating &amp; Cooling Inc</a>	<a href="#">Harlingen</a>
<a href="#">Ballenger Construction CO</a>	<a href="#">Harlingen</a>	<a href="#">Metro Cable Svc Inc</a>	<a href="#">Harlingen</a>
<a href="#">Hess Air Inc</a>	<a href="#">Harlingen</a>	<a href="#">Rio Mechanical Inc</a>	<a href="#">Harlingen</a>
<a href="#">Janitrol Distributors</a>	<a href="#">Harlingen</a>	<a href="#">Sais Commercial Systems</a>	<a href="#">Brownsville</a>
<a href="#">K K Busters Plumbing</a>	<a href="#">Brownsville</a>	<a href="#">Valley Weathermakers</a>	<a href="#">Harlingen</a>

## Career Options

### (Specific Job Types)

- Electrician
- Maintenance Electrician
- Journeyman Electrician
- Inside Wireman
- Control Electrician
- Electrician Technician
- Industrial Technician
- Journeyman Wireman

## Salary Ranges

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### Wages for Electricians

Location	Pay Period	2011				
		10%	25%	Median	75%	90%
United States	Hourly	\$14.61	\$18.06	\$23.71	\$31.38	\$39.75
	Yearly	\$30,400	\$37,600	\$49,300	\$65,300	\$82,700
Texas	Hourly	\$12.59	\$15.95	\$20.08	\$25.26	\$29.52
	Yearly	\$26,200	\$33,200	\$41,800	\$52,500	\$61,400
Brownsville-Harlingen, TX MSA	Hourly	\$10.26	\$12.67	\$15.63	\$18.25	\$22.24
	Yearly	\$21,300	\$26,400	\$32,500	\$38,000	\$46,300
McAllen-Edinburg-Mission, TX MSA	Hourly	\$9.96	\$12.27	\$14.93	\$17.13	\$18.46
	Yearly	\$20,700	\$25,500	\$31,100	\$35,600	\$38,400

### Professional Associations linked to the Careers

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For details about apprenticeships or other work opportunities in this trade, contact the offices of the state employment service, the state apprenticeship agency, local electrical contractors or firms that employ maintenance electricians, or local union-management electrician apprenticeship committees. Apprenticeship information is available from the U.S. Department of Labor's toll-free help line, 1 (877) 872-5627, and [Employment and Training Administration](#).

For information about union apprenticeship and training programs for electricians, visit [The International Brotherhood of Electrical Workers and National Electrical Contractors Association's National Joint Apprenticeship Training Committee](#)

For information about independent apprenticeship and training programs, visit [Associated Builders and Contractors, Inc.](#)  
[Independent Electrical Contractors, Inc.](#)  
[National Association of Home Builders](#)  
[National Center for Construction Education and Research](#)

### Sources

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The information provided in this document was collected from the following sources:

- Occupational Outlook Handbook (<http://www.bls.gov/ooh/>)
- O\*NET OnLine (<http://www.onetonline.org/>)
- Texas CARES (<http://www.texascaresonline.com/>)
- CareerOneStop (<http://www.careeronestop.org/>)