

Sophomore Year, Introduction to Electrical and HVAC (one hour) - Students will be introduced to the Electrical and HVAC trades. They will also cover Trade Mathematics including angles, measurements, volume, and conversions. Safety and electrical circuits are discussed. Students will get hands on practice in state of the art lab areas.

Junior Year, Electrical and HVAC Technology (two hour block) - Students acquire knowledge and skills in safety, electrical and HVAC theory, tools, national codes, installation of electrical and HVAC equipment, and the reading of construction drawings, schematics, and specifications. Students will also practice bending conduit, and learn the dynamics of heating and cooling, and air distribution systems. During the year, the students will have the opportunity to "work in the field" as they begin work on their practicum.

Senior Year, Advanced Electrical and HVAC Technology (two hour block) - Students gain knowledge and skills needed to enter the work force as an electrical apprentice or HVAC technician, or prepare for a post-secondary degree in construction. Students acquire additional skills in electrical technology to include alternating current and direct current motors, conductor installation, installation of electrical services, and electric lighting installation. Additionally, students acquire knowledge and skills in safety, electrical theory, tools, codes, installation of commercial HVAC equipment, heat pumps, troubleshooting techniques, various duct systems, and maintenance practices.

ENRICHMENT OPPORTUNITIES

The Academy wants students to see and experience the world of construction. Field trip opportunities are abundant and appropriate to the chosen strand. In addition to job site visits, students also have the opportunity to go on college visits with peers in other strands.

Construction Careers Academy has a very active business partnership base. Job shadowing is arranged where students can visit a company and shadow a professional in their strand. The Academy has successfully placed students in paid internships over the summer and during the school year. Job assistance is also available to CCA alumni.

(Source BLS Electrician and HVAC Technician)



The mission of CCA is to provide an advanced and rigorous curriculum with a focus on construction technology, construction management, architectural design, applied engineering and real-world experience that will prepare students for studies in higher education and/or a career in a construction-related industry.



CONSTRUCTION CAREERS
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AT WARREN HIGH SCHOOL



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**Preparing Students
for Jobs in the Trades**



**ELECTRICAL/HVAC
PROGRAM**

Electrical/HVAC

IS THE ELECTRICAL/HVAC PROGRAM THE RIGHT FIT?

Students interested in the Electrical/HVAC program have a strong desire to work with their mind and their hands.

The Academy's Electrical/HVAC Dual-Major program is unique in that the curriculum is highly vested in project-based learning. Students will have the opportunity to engage in real-world applications, collaborate with some of the industry's top rated business professionals, and work with plumbers, welders, and construction managers. Upon completion of the Electrical/HVAC program, students will be prepared to enter the workforce, attend a two-year college, earn an Associate's Degree and/or a certification in a field of their choice, or complete their apprenticeship hours with another registered program.

Electricians read blueprints, which include technical diagrams of electrical systems that show the location of circuits, outlets, and other equipment. They use different types of hand and power tools to run and protect wiring. Commonly used hand and power tools include pipe benders, screwdrivers, wire strippers, drills, and saws. Electricians may also use ammeters, voltmeters, thermal scanners, and cable testers to find problems and ensure that components are working properly.

Heating, air conditioning, and refrigeration mechanics and installers—often called HVAC technicians—work on heating, ventilation, cooling, and refrigeration systems that control the temperature and air quality in buildings. HVAC technicians work mostly in homes, schools, stores, hospitals, office buildings, or factories. Some technicians are assigned to specific job sites at the beginning of each day. Others travel to onsite locations, making service calls.

APPRENTICESHIP PROGRAM

CCA is a registered Department of Labor Student-to-Apprenticeship program. Most electricians learn their trade in a 4- or 5-year apprenticeship program. For each year of the program, apprentices typically receive 2,000 hours of paid on-the-job training as well as some classroom instruction. While at CCA, students will receive apprenticeship hours. In the classroom, apprentices learn electrical theory, blueprint reading, mathematics, electrical code requirements, and safety practices.

After completing an apprenticeship program upon graduation, electricians are considered to be journey workers and may perform duties on their own, subject to any local or state licensing requirements.

EMPLOYMENT FORECAST FOR ELECTRICIANS

According to the Bureau of Labor Statistics (BLS), electricians can anticipate, on average, a 9 percent job growth rate between 2016 and 2026. Electricians held 666,900 jobs in 2016.

Salary Range: On average the salary for a person in the electrical trades ranges from \$31,800 to \$90,420. The median annual wage for electricians was \$52,720 in May 2016.

Electrician Jobs:

Electricians typically do the following:

- Read blueprints or technical diagrams
- Install and maintain wiring, control, and lighting systems
- Inspect electrical components, such as transformers and circuit breakers
- Identify electrical problems using 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 Electrical Code
- Direct and train workers to install, maintain, or repair electrical wiring or equipment

Related Occupations:

Solar photovoltaic (PV) installers, also known as PV installers, assemble, install, and maintain solar panel systems on rooftops or other structures. They earn an average annual salary of \$39,240.

Line installers and repairers, also known as line workers, install or repair electrical power systems and telecommunications cables, including fiber optics. They earn an average annual salary of \$62,650.

Electrical engineers design, develop, test, and supervise the manufacturing of electrical equipment, such as electric motors, radar and navigation systems, communications systems, and power generation equipment. Electronics engineers design and develop electronic equipment, including broadcast and communications systems, such as portable music players and Global Positioning System (GPS) devices. They earn an average annual salary of \$96,270.

EMPLOYMENT FORECAST FOR HVAC TECHNICIANS

According to the Bureau of Labor Statistics (BLS), A/C & heating techs can anticipate a 15 percent job growth rate between 2016 and 2026. In 2016, HVAC technicians held 332,900 jobs.

Salary Range: On average the salary for a person in the HVAC industry ranges from \$28,400 to \$73,300 annually with the average salary being \$45,900.

HVAC Jobs: Heating, air conditioning, and refrigeration mechanics and installers typically do the following:

- Install, clean, and maintain HVAC systems
- Install electrical components and wiring
- Inspect and test HVAC systems and components
- Discuss system malfunctions with customers
- Repair or replace worn or defective parts
- Recommend maintenance to improve system performance

TIPS FOR SUCCESS IN THE ELECTRICAL/HVAC PROGRAM

Students who enter the Academy's Electrical/HVAC program should begin preparing for the rigor of the program. Here are some tips that will help:

1. Develop good study habits.
2. Develop a system of organization. Good time management is of the essence.
3. Start building a portfolio.
4. Invest time in networking with individuals in the field.

COURSE SEQUENCE & DESCRIPTIONS FOR THE ELECTRICAL/HVAC STRAND

The Academy's advanced and rigorous curriculum is guaranteed to challenge and prepare students for a successful career in the fields of HVAC (A/C & Heating) or Electrical. Students will be prepared to face the challenges of a certification program and/or a post high school career of their choice. Students in the Electrical/HVAC strand will adhere to the following **Course Sequence**:

Freshman Year, Principles of Construction – All freshmen at CCA are required to take this course their first year in the Academy. Safety, hand tools, power tools, and reading technical drawings are introduced. Students will begin to develop an understanding of the educational requirements and career opportunities in this cluster. Students will leave this class prepared for their strand choice with a certification in the 10 Hour OSHA Construction and in NCCER Core.