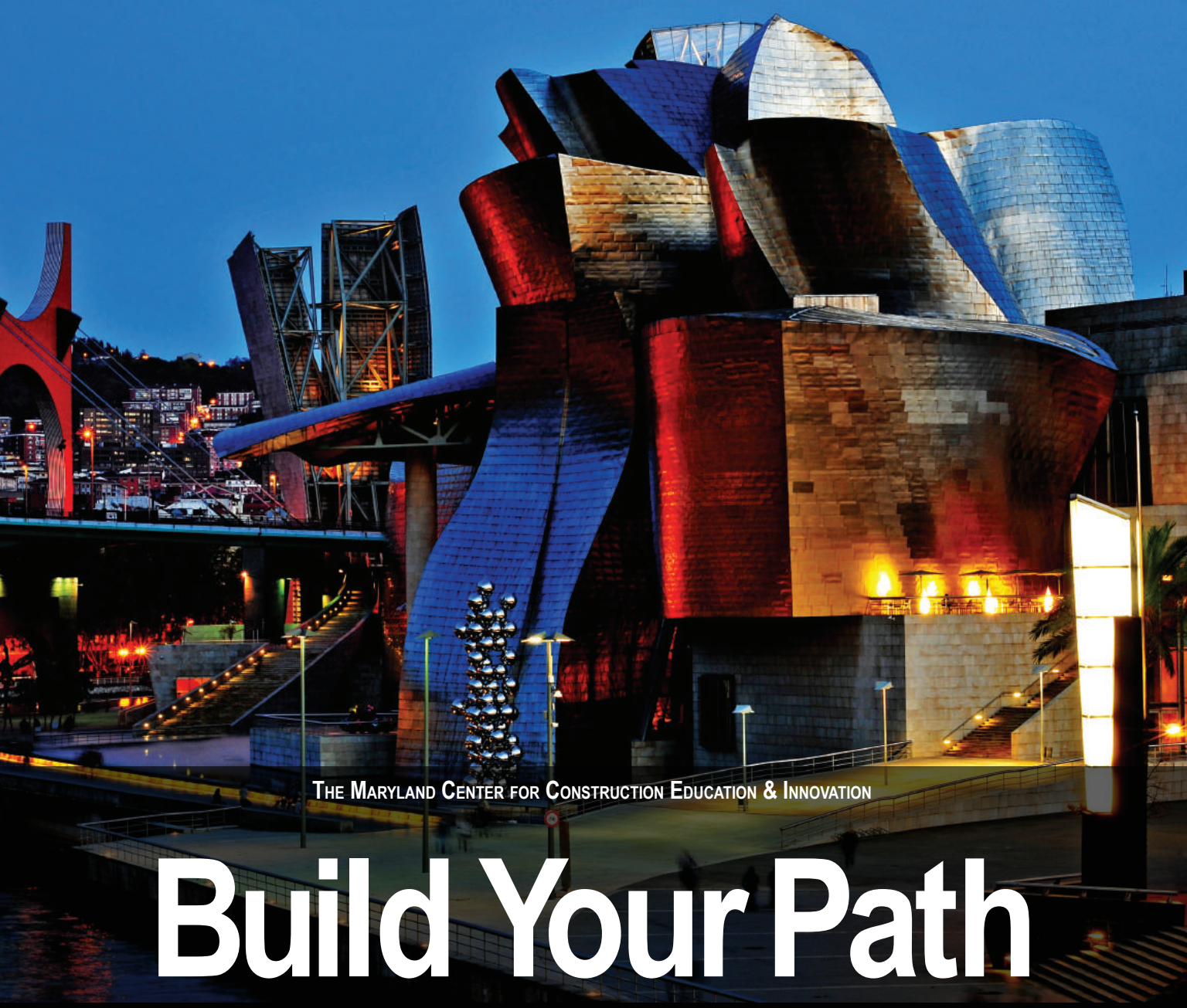


The Maryland Center for Construction Education & Innovation

Build Your Path

A Guidebook for Built Environment Careers

Sponsored by The Building Congress & Exchange Foundation

ANNE ARUNDEL COMMUNITY COLLEGE

At AACC, we have been redefining futures for students like Ryan since 1961. Choose from hundreds of degree and certificate programs to launch or advance your career.

aacc.edu/architecture | 410-777-2437

The Building Congress & Exchange Foundation is helping to build the future of the construction industry.

The BC&E Foundation provides:

- ☑ **scholarships** for promising high school students to pursue a career in construction or design
- ☑ **grants** to deserving organizations that teach quality industry programs
- ☑ **hands on workshops** for students to learn all facets of the industry
- ☑ **support for special projects** that educate our future workforce

BIT BUILDERS-IN-TRAINING WORKSHOP

BCE Foundation
Building Congress & Exchange

Learn more at www.bcebaltimore.org/foundation

Build Like a Girl.

What kind of woman can make a career in construction? ALL kinds.
Outdoorsy types, computer nerds, DIYers, math geeks, creative geniuses.

We Need You.

If you're interested in a career in construction, any kind, NAWIC is here to help. We offer:

- Scholarships
- National CAD Drafting competition
- MAGIC Camp (Mentoring A Girl in Construction)

NAWIC Builds

Visit www.NAWIC.org or www.NAWICBaltimore.org

The Mechanical Contractors Association of Maryland is a premier trade association dedicated to the promotion and support of high quality, safe mechanical construction.

MCA-Maryland is focused on the education, promotion and success of our member companies providing high-quality educational materials and programs to help them attain the highest level of managerial and technical expertise.

Established in 1927, MCA-Maryland represents companies that design, build, retrofit, replace, maintain and service mechanical, plumbing and piping systems for residential, commercial, institutional, industrial and government buildings/ installations.

MCA-Maryland members have access to educational programs, training seminars, networking & social outings, legislative advocacy, technology, communications and discounted services to grow their business.

MCA MECHANICAL CONTRACTORS ASSOCIATION MARYLAND

Success By Association.

MCA-Maryland
3600 O'Donnell Street
South Tower – Suite 800
Baltimore, Maryland 21224

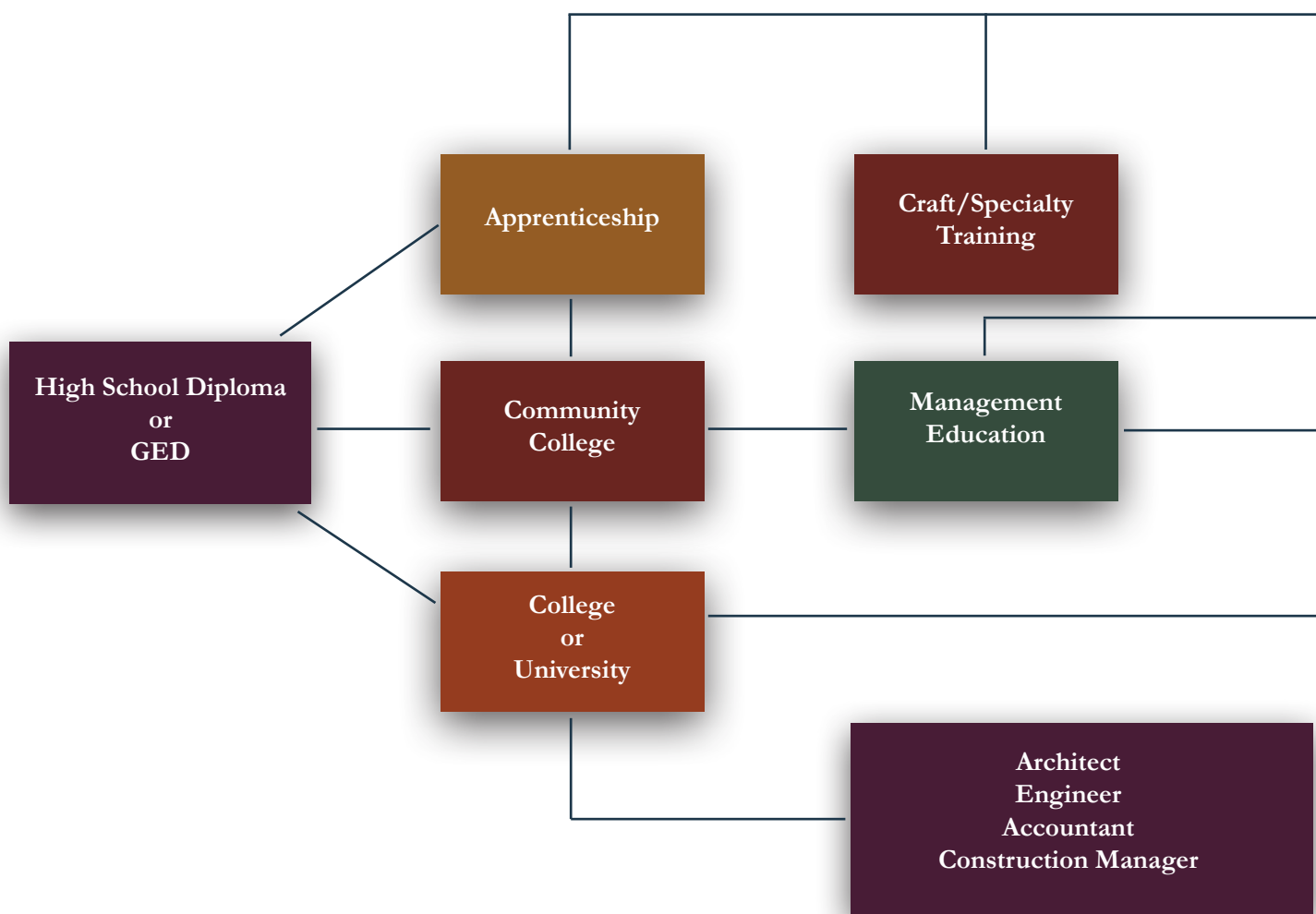
For information or guidance in your career path contact us at: 410-276-1926
info@MCA-Maryland.org

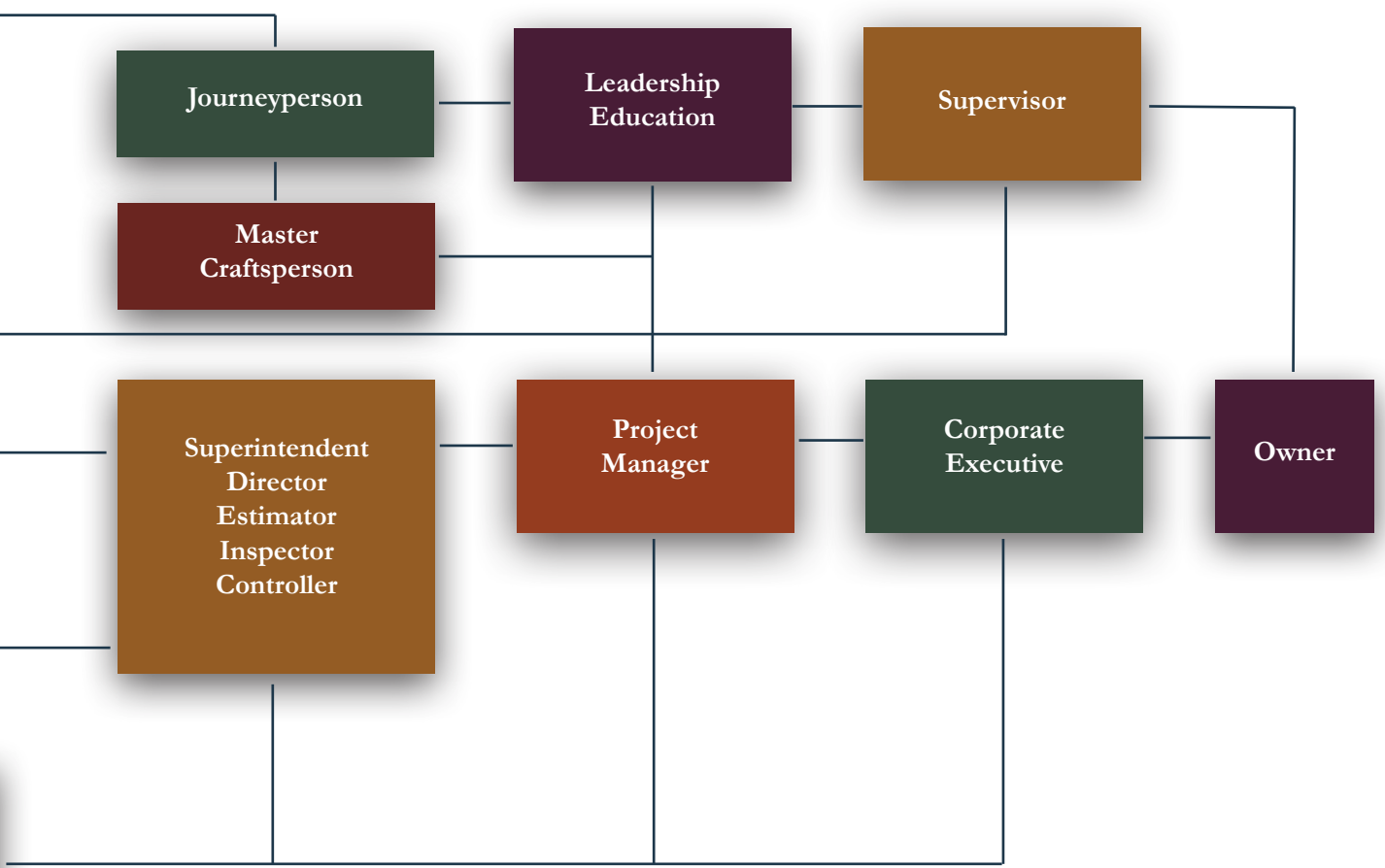
www.MCA-Maryland.org

Content

Pathways

No two people are alike. You can make the path that you pick work for you and your individual situation. The important thing is that there is no right or wrong answer. Whether it takes you 2 years or 10 years to get through your path, there is a place for you if you have the drive and passion to finish. You could start off as a laborer and eventually become a construction manager. You could go to college and become and engineer and decide that you are happier being a carpenter. Or you could start off as an apprentice, become a master trades professional and own your own business. It won't be easy and it will require a lot of hard work, but your path is yours. The destination is up to you and you'll have help along the way.




Journeyperson
Leadership Education
Supervisor
Master Craftsperson
Superintendent
Director
Estimator
Inspector
Controller
Project Manager
Corporate Executive
Owner

HARKINS BUILDERS

BALTIMORE / WASHINGTON / PHILADELPHIA

Build Your World

Not that long ago I was an intern. Now I'm leading a team planning multi-million dollar projects.

Dave
Senior Estimator
B.S. Construction Management
VA Tech 2006

I'm helping my team build a $60 million project on time and on budget.

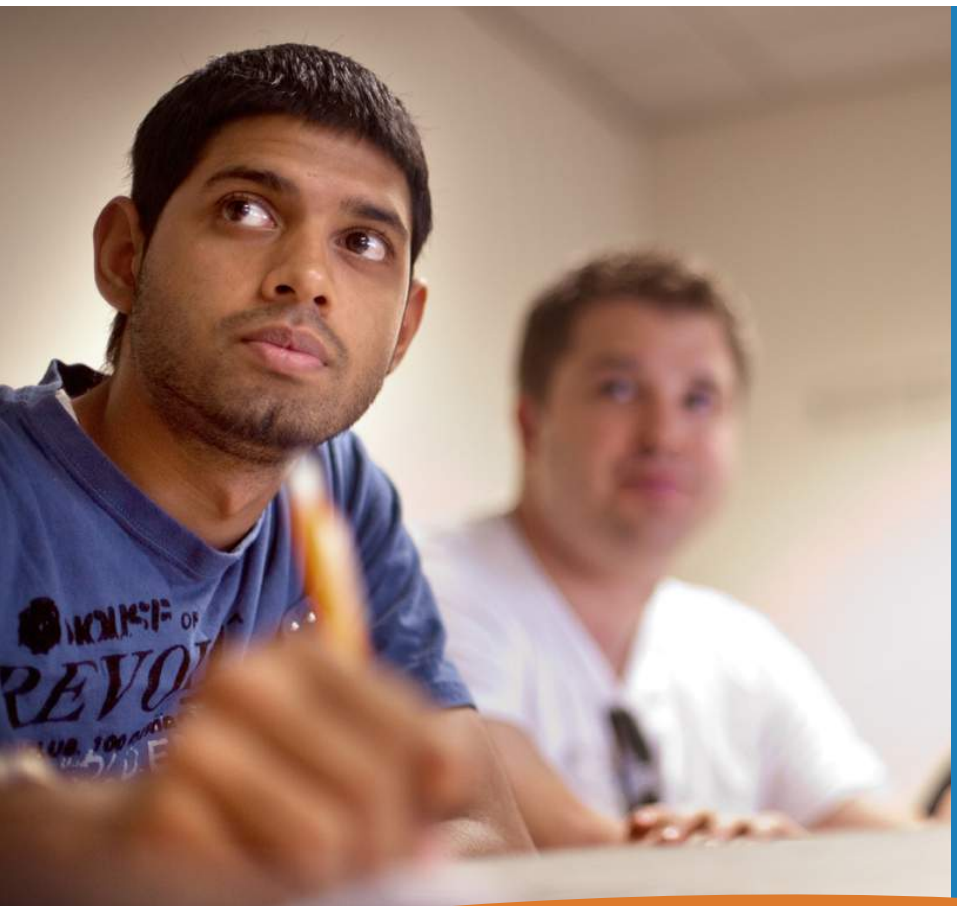
Meghan
Project Engineer
B.S. Civil Engineering
U of MD 2015

Every day I have the satisfaction of building something of quality that is essential and long-lasting.

Richard
Superintendent
Veteran,
U.S. Navy Seabees

We're the men and women professionals who plan and manage how buildings get built. We're business people, engineers, construction managers, and more. Ask your guidance counselor about the great career possibilities in construction.

Visit our Careers page at HarkinsBuilders.com



Real estate is the largest asset class in the world — and you'll be ready to invest, develop and manage it — with the knowledge you'll gain at the University of Baltimore.

The Real Estate and Economic Development program at UB is Maryland's only bachelor's degree designed to prepare graduates for careers in commercial real estate investment, development and/or management, mortgage banking and lending, and local economic development.

Students explore the connection between theory and practice in collaboration with engaged faculty and industry professionals who lead classroom discussions, facilitate development site visits, provide internships and offer invaluable guidance on career opportunities.

Learn more about the B.S. in Real Estate and Economic Development at **ubalt.edu/realestate.**

ub UNIVERSITY OF BALTIMORE
KNOWLEDGE THAT WORKS

Earning Potential

In the pages that follow, MCCEI has published starting and experienced annual salaries for built environment careers. Published salaries are annual pay and do not include other compensation such as paid vacation time or company paid health insurance. It is important to note that actual salaries will vary from region-to-region, employer-to-employer and job-to-job. These were published simply to give you an idea of what people in these jobs can make.

Earnings potentials will also depend on you and your pathway. While it is true that published data shows a four year college degree has a higher lifetime earnings than non-college pathways, you should take into account that you have to spend a lot of money and four to five years of your life to get that degree.

College

18-22 — During this time, you are usually losing money due to student loans and living expenses. Some can be made up by having a job, scholarships, commuting, or grants.

Graduate — Your income immediately increases, but you will begin to pay loans off.

Career — Growth in income increases over time. However, you may have to pay off loans for a number of years.

Apprenticeship

18-22 — During this time, you get payed to learn. $20,000-30,000 per year is average for an apprentice.

Journeyman — Your income significantly increases at this point, with no student debt.

Career — Growth in income increases over time. You won't have any student loan debt.

Workforce

Diploma or GED — You immediately receive income, but it may be on the lower side because you are just starting out.

Career — Income increases over time. However, you may not earn as much as those with a degree or certificate. Continuing education classes or training certificates can increase your odds of receiving promotions.

Architect

Architects are licensed professionals who design buildings, including houses or commercial structures. They can be hired for a range of projects including renovations, designing a single room or designing a complex of buildings.

What Architects Do

Architecture is a highly technical profession requiring vast knowledge of building materials, codes, engineering principals, and spatial relationships. At the same time, it is also a highly creative career that allows for both functional and aesthetically pleasing designs.

Architects meet with clients to discuss objectives, requirements, and conceptual budgets. Before initial meetings, they may conduct impact studies or site investigations. To obtain an accurate budget estimate, they may determine the required materials, time, and equipment costs. Once plans and budgets have been agreed upon, architects then develop construction documents, which typically illustrate the floor plans and general appearance of the structure to be built.

In designing structures, architects need to follow all state and local buildings codes, along with zoning laws. They also have to ensure that the structure adheres to fire regulations and any requirements for accessibility.

Although architects used to draw plans by hand, most now use software that often involve computer-aided drafting and building information modeling programs. Some architects design buildings by themselves, whereas others receive help from drafters, who use these software programs professionally. Nevertheless, drawing by hand continues to be practiced, especially during the early stages of design.

Once plans are approved and construction begins, architects periodically visit the construction site to make sure that the project is following the finalized design and the construction schedule. They carry out these tasks by meeting with construction managers and other contractors in order to address project progress, outstanding problems and discuss solutions.

Work Environment

Only one in five architects is self-employed, meaning that most architects work in firms. In either case, architects work in an office setting, where they meet with clients to develop projects. They also write reports and may work with other architects and engineers on a team. As their careers progress, architects may have the opportunity to work from home.

Architects work full-time, yet might need to work longer hours to meet deadlines. Architects who are self-employed tend to work longer hours because they do not share responsibility. However, they do enjoy the option of having a more flexible work schedule.

Becoming an Architect

There are three major steps in the process of becoming an architect: earn a degree in architecture, gain experience from a paid internship, and pass examinations to become a registered architect.

To become an architect in the United States, a professional degree in architecture is required in all states. A typical bachelor's degree in architecture takes 5 years to complete, after which many graduates stay in school to earn their master's degrees, which often take another 1–5 years to complete, depending on the student's previous education. Many states require an architecture degree from an accredited school, as opposed to a general degree. Information about accreditation can be obtained from the National Architectural

Accrediting Board and the National Council of Architectural Registration Board. Once an aspiring architect earns a professional degree, a lengthy paid internship is necessary. Internships typically fulfill the 3-year period requirement for the Architect Registration Board. Some internships completed during undergraduate education may count toward the total internship period.

In all US states, architects are required to be licensed, which first requires them to earn a professional degree, fulfill the internship period, and pass the Architect Registration Examination. In addition to becoming registered, all architects have to earn continuing education credits throughout their careers. In fact, one in three architects also opt to become certified by the National Council of Architects Registration Board by receiving the designation of the American Institute of Architects, which allows them to more easily become licensed in many states.

Average Salary
The average starting salary is $53,825. With experience, they can possibly earn up to or over $97,918.

Important Skills
Analytical skills
Communication skills
Organizational skills
Technical skills
Visualization skills

Building Inspector

Building inspectors ensure that all buildings and construction sites meet local and national building codes. They also ensure that all zoning regulations are followed and contract specifications met. They may inspect any combination of highways, buildings, water systems, dams, and bridges, among a host of other structures, as well as heating, ventilation, and air-conditioning systems.

What Building Inspectors Do

Building inspectors review building documents to make sure that the plans and specifications meet all code requirements. Once their review is complete, they issue an approval so that construction may commence. Over the course of the project, they periodically inspect the site to make sure the work is up to code. Using a variety of meters and testing equipment, they inspect plumbing, electrical, and other systems, as well as verify that buildings are level and at the correct elevation. If inspectors detect a problem, then they issue a violation or stop-work order until the problem is resolved. Daily logs of individual sites are kept so that progress and problems can be tracked for the duration of each project. Inspectors also provide written feedback of their findings once projects have been completed.

The following are examples of types of inspectors:

Building inspectors
Coating inspectors
Electrical inspectors
Elevator inspectors
Home inspectors
Mechanical inspectors
Plan examiners
Plumbing inspectors
Public works inspectors
Specification inspectors

Work Environment

Although many building inspectors are direct employees of state and local governments, they can work for private companies contracted on behalf of governments, banks, and third parties. Inspectors spend their time in a variety of situations. They may be outdoors at a construction site or inside buildings; they also spend time in onsite trailers reviewing construction documents, plans, and specifications. Most inspectors work alone, yet may work on a team to complete complex projects.

Inspectors work full-time during typical business hours. However, overtime on construction sites may be necessary, especially in the case of a problem or accident. Home inspectors normally work during typical hours, yet may have to spend their nights creating reports.

Becoming an Inspector

No matter how much work experience an aspiring building inspector has, a high-school diploma is required to obtain the position. Many certifications and degrees for building inspectors that can be helpful when applying for jobs, in addition to coursework in building inspection, home inspection, construction technology, and drafting.

Building Inspectors have to be able to understand all aspects of construction; therefore, the best inspectors have held a variety of jobs in the industry. Employers tend to hire candidates with both training and experience in construction.

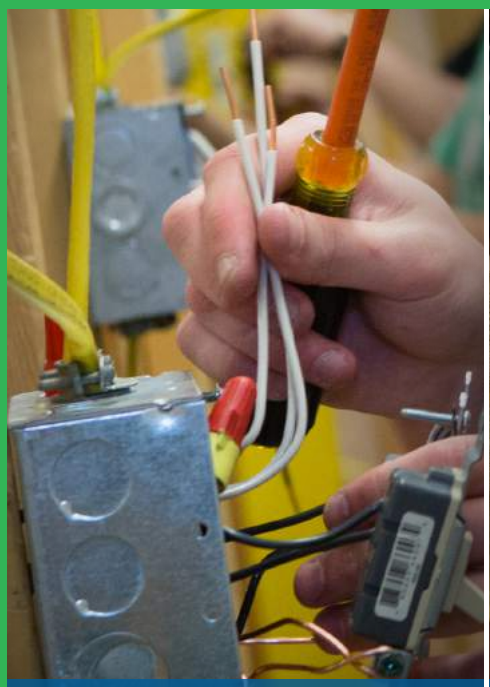
In the United States, most states require inspectors to be licensed, which can be achieved by passing an examination and having a certain amount of experience.

Average Salary
The average starting salary is $40,937. With experience, they can possibly earn up to or over $64,277.

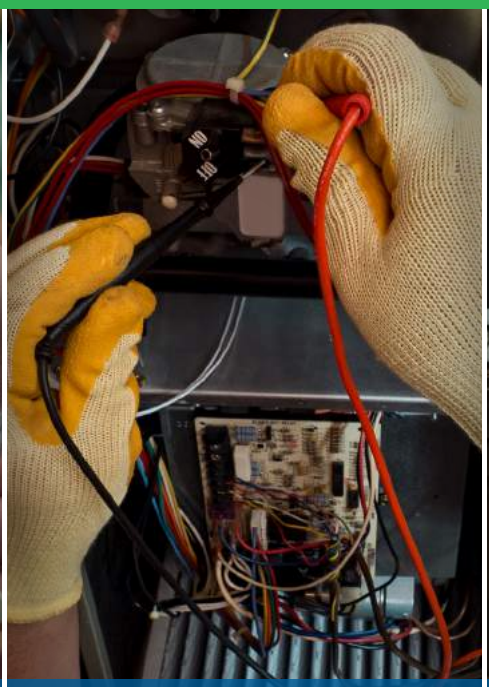
Important Skills
Communication skills
Craft trade experience
Mechanical knowledge
Physical stamina

FREDERICK COMMUNITY COLLEGE

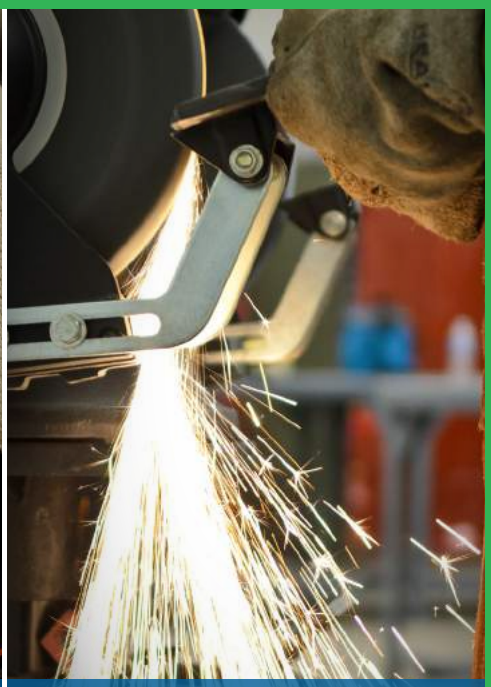
FCC offers short term certificate programs for the Building Trades. Start working toward your career with a course today!



ELECTRICAL



HVAC



WELDING

Frederick Community College

For more information visit www.frederick.edu or call 240-629-7985

Seamless Transfer Options from community colleges
All major courses are in the evening
Located in State of the Art LEED building

BSCM @ MORGAN

The Bachelor of Science in Construction Management (BSCM) program at Morgan State University develops students who understand the complexity of construction projects, appreciate the values of sustainable principles and their applications, and are able to effectively manage people in the field.

For more information
morgan.edu/sap/bscm
bscm@morgan.edu

THERRIEN WADDELL

COMMERCIAL GENERAL CONTRACTOR
CONSTRUCTION MANAGER





100 Lakeforest Boulevard, Suite 600
Gaithersburg, Maryland 20877

301.770.2275
www.TherrienWaddell.com

Carpenter

Carpenters build and repair framework and structures, which can entail working with wood or steel framing, stairways, doorways, and rafters. They may also build and install cabinets and drywall. Alternatively, many carpenters become specialized in artisan millwork or room finishing.

What Carpenters Do

Carpenters perform many different tasks during their workdays. They need to be able to read and understand construction documents, plans, and specifications. Carpenters install many different building components, including windows, cabinets, and doors, and have to be able to measure and cut wood accurately as well as properly construct walls, floors, and doorways. They may rely on cranes and other large equipment for assistance when constructing building frameworks.

The following are types of carpenters:
Residential carpenters
Commercial carpenters
Industrial carpenters
Finish capenters

Work Environment

Because carpenters are involved in many types of construction, from building highways and bridges to installing kitchen cabinets, they work both indoors and outdoors.

Carpenters normally work full time and usually work on evenings and weekends. Overtime is also common for carpenters, especially when working to meet deadlines. Around 36% of carpenters are self-employed, most of whom work in residential settings.

Becoming a Carpenter

An apprenticeship is the typical launchpad for a career in carpentry. However, some aspiring carpenters may begin as assistants without having had any formal training. Either way, a high school diploma or equivalent is required. Mathematical skills are crucial in this career, so special attention should be paid to mathematics coursework in school.

An aspiring carpenter can also attend a two-year technical school to earn a carpentry degree. Many credits earned during apprenticeships can be counted toward an associate's degree.

Many carpenters go on to become independent contractors or construction superintendents. Carpenters tend to have a vast understanding of the entire construction process, which allows them to advance their careers quickly.

Average Salary

The average starting salary is $30,442. With experience, they can possibly earn up to or over $53,057.

Important Skills

Business skills
Attention to detail
Manual dexterity
Advanced mathematical skills
Physical stamina
Physical strength
Problem-solving skills

Civil Engineer

Civil engineers design, maintain, and supervise large projects and systems, including roadways, airports, tunnels, large commercial buildings, bridges, and water systems. Civil engineering is one of the most diverse fields in the construction industry.

What Civil Engineers Do

Civil engineers normally begin projects by analyzing site plans, which are similar to maps, and other data in order to plan projects accordingly. Specifically, civil engineers take into account government regulations, environmental hazards, and risk analysis data when planning projects. They are responsible for developing the project budget and schedule for the civil engineering work, as well as for submitting all permit applications before beginning a project. Civil engineers oversee soil testing in order to determine the type and durability of any foundation that is needed.

Civil engineers use software programs in designing transportation, hydraulic, and structural systems. While designing such systems, they make sure that plans align with industry standards. Once a project is underway, they oversee all aspects, from the initial survey to the structure's completion. Many engineers also go on to maintain and repair infrastructure.

Civil engineers occupy supervisory positions. They may work on other projects and receive assistance from civil engineering technicians. If federally employed, then civil engineers may be able to inspect structures and projects in order to make sure that the projects comply with regulations. Civil engineers work on complex projects and tend to specialize in one of several areas, including the following:

Construction engineers complete construction projects such as drainage systems, railways, and road systems.

Geotechnical engineers work with earth materials to build, for example, retaining walls and foundations.

Structural engineers design structural supports for bridges, space stations, stadiums, airliners, and other structures.

Transportation engineers design transportation systems as part of urban planning, waterways, roadways, and air transportation.

Work Environment

Most civil engineers work in an office setting, yet periodically need to visit construction sites to review their progress. Some travel to other countries in order to work on larger projects. Civil engineers work full-time, but may need to work longer hours to meet deadlines. In 2012, one in four engineers worked more than 40 hours per week.

Becoming a Civil Engineer

The starting point for any career in civil engineering is earning a bachelor's degree from an Accreditation Board for Engineering and Technology (ABET) accredited school in Civil Engineering or a related field. Upon graduation, an engineer can pursue licensing, the Professional Engineer (PE) designation, or continue on to Master's or Doctorate degrees.

Licensing is required for anyone that works in the public sphere such as designing bridges, roadways and public places. Licensing varies from state-to-state and often requires several years of practice and successfully passing state licensing examinations. To become a Professional Engineer, a graduate must first pass the Fundamentals of Engineering examination and become an Engineer-In-Training (EIT). EIT's typically work for a minimum of 5 years under supervision of a licensed or Professional Engineer and then must pass the Professional Engineers examination. Licensures and designations must be maintained with continuing education throughout one's career. About one in five graduates go on to earn Master's or advanced degrees.

Licenses, designations and advanced degrees are not required to have a long and successful career; however, these are the most highly recognized pathways to promotions, leading projects and increasing responsibilities.

Average Salary

The average starting salary is $59,334. With experience, they can possibly earn up to or over $102,242.

Important Skills

Decision-making skills
Leadership skills
Mathematical skills
Organizational skills
Problem-solving skills
Writing skills

Construction Manager

Construction managers oversee all aspects of worksites and construction projects. They plan, coordinate, budget, and supervise all phases of construction through project completion. Construction managers may work as a general contractor or project manager.

What Construction Managers Do

Construction managers oversee most of the personnel working on construction sites, meaning that their role is supervisory. They develop a detailed construction schedule and coordinate with electricians, HVAC mechanics, and plumbers, among others, to ensure that projects stay on schedule and within their budgets. It is possible for large projects to encompass multiple worksites at once, in which case construction managers need to oversee the entire project. Construction managers may also work as cost estimators.

Communication is a critical aspect of a construction manager's job. For the duration of a project, the construction manager coordinates all meetings among owners, architects, engineers, bankers, and government officials.

Work Environment

Most construction managers work from a field office on a construction site—most typically, a trailer equipped with everything normally found in an office setting. Working onsite allows the construction manager to oversee the entire project and make quick decisions when necessary. Traveling is required, especially if construction managers oversee multiple projects.

Most managers work full time on weekdays. However, working on weekends and as part of overtime may be required, especially to meet deadlines or in the case of an emergency. Since problems and emergencies do arise, many construction managers are on-call 24 hours a day.

Becoming a Manager

Construction management is a unique field, in which many managers have worked their way up from trade or engineering positions, whereas others have earned a bachelor's degree in construction management at a 4-year university. In either case, it is highly recommended for construction managers to have field experience and to understand all aspects of construction. Currently, certifications are not required, yet are becoming increasingly popular.

When beginning this career, a budding construction manager will likely work as an assistant under an experienced manager. He or she may stay in this position for a couple of months to a few years before being promoted to management.

Average Salary

The average starting salary is $65,287. With experience, they can earn up to or over $117,842.

Important Skills

Analytical skills
Business skills
Communication skills
Customer service skills
Decision-making skills
Initiative
Leadership skills
Speaking skills
Technical skills
Time management skills
Writing skills

We're here. We hire. We train. We need you.

Why Construction?

- Industry expected to grow twice as fast as the average of other industries
- Great Wages
- Limitless Career Path
- Industry with the greatest employee engagement and job satisfaction
- Variety of Professions (From the field to in the office)
- Get paid while you attend classes
- DEBT — Minimal to ZERO Student loan debt

Why Shapiro & Duncan?

- Tuition Reimbursement
- Award-Winning Company
- Competitive Benefits Package
- Paid Internships
- Paid Training including Apprenticeship Sponsorship
- Employee Recognition (Awards, Competitions, Bonuses)

14620 Rothgeb Drive Rockville, MD 20850 - (301)315-6260 - www.shapiroandduncan.com

Montgomery College

Start Building Your Construction Management Career

- Day and evening classes
- Certificate and associate's degree programs
- Transfer option to Universities at Shady Grove
- Nationally recognized Construction Management program

Learn to plan, organize, and direct every aspect of construction with today's technology.

montgomerycollege.edu/constructionmanagement

For more information, contact the program coordinator at 240-567-7616.

Drafting and Virtual Designer

Drafting and Virtual Designers are the backbone of all careers in engineering and architecture. Using computing software, drafters prepare technical drawings and plans that become templates for constructing a host of buildings and systems.

What Designers Do

Designers rely on drafting software to lay out plans. They normally receive a rough sketch or hand-drawn layout of a project that they need to convert into a computerized model. Designers with more experience may also add certain details and information that they know is helpful. Once an initial layout has been created, a designer creates multiple versions of the layout with different requirements for the architects and engineers to review. Designers also ensure that all dimensions, materials, and procedures for projects are detailed in the plans.

Most designers use computer-aided design and drafting systems to create and store technical data. These systems normally have more detailed information, including materials and dimensions. These drawings can then be shared electronically or printed. Increasingly common are programs involving building information modeling, which creates 3-D modeling using layers so that an entire building can be visualized. This technology allows for better collaboration among personnel and shows unexpected problems before they are built. Product data management systems that track and manage data help mechanical drafters by allowing them to create drawings as work is completed by other professionals working on the project.

The following are examples of types of designers:
Aeronautical designers
Architectural designers
Civil designers
Electrical designers
Mechanical designers
Process piping or pipeline designers

Work Environment

Most designers work full-time in an office setting. They spend their time at desks, though may occasionally travel to jobsites and collaborate with architects and engineers.

Becoming a Designer

Most designers receive a degree from a 2-year college or technical school.

Average Salary

The average starting salary is $37,806. With experience, they can possibly earn up to or over $60,139.

Important Skills

Critical thinking skills
Attention to detail
Interpersonal skills
Mathematical skills
Time management skills

Electrician

Electricians install and maintain electrical systems, including lighting and control systems, for public and private clients.

What Electricians Do

Most public and private locations use some sort of electrical power for lighting, communication systems, appliances, and sound systems. Any system that involves electrical wiring is usually installed and maintained by an electrician. Installing these systems while buildings are constructed is usually easier and less complicated than updating or renovating a building.

Electricians need to be able to read construction documents, plans, and specifications in order to understand the location of wiring in a building. Fortunately, most electrical plans show where all of the circuits, outlets, and other devices are located, and special tools have been developed over the years to help electricians to perform their work safely and more efficiently, such as the short tester able to identify the short in a circuit.

Although electricians normally work alone, when designing new buildings they may need to work with engineers and architects in order to ensure that no building conflict arise. To that end, the introduction of building information modeling has helped to reduce the likelihood of problems. Electricians may also work in teams if they are part of a large company, and some may supervise new apprentices.

The following are examples of types of electricians:

High-voltage electricians work on systems that are high voltage, including power lines and generators.

Interior electricians work solely on systems inside buildings.

Residential electricians work in residential homes by installing electrical systems, updating old systems, or diagnosing and fixing electrical problems.

Work Environment

The work of electricians varies widely in terms of environment. Some electricians work completely outdoors, such as those who repair telephone lines or work on construction sites, whereas others work mostly indoors. The work of electricians is job-site rather than office-based. About 9% of electricians are self-employed.

Because electrical systems are generally situated in confined areas, electricians may need to work in small spaces or strange angles in order to perform their jobs.

Note that electricians can face many risks while fulfilling their duties. They must wear protective clothing and follow all safety procedures.

Electricians work full-time and have schedules that often involve work on evenings and weekends. Since many electricians work outside, available work shifts can vary due to weather. Overtime is also sometimes necessary, especially when working on new construction projects.

Becoming an Electrician

Being an electrician is considered to be a trade career that generally requires an apprenticeship in order to become licensed, as required by law. Although the primary requirement to become an apprentice electrician is a high-school diploma or equivalent, many aspiring electricians attend technical school. Programs at these schools may offer specific certifications and training that count as credit toward completing an apprenticeship. Apprenticeships typically last 3–4 years, after which a journeyman's license is awarded. This allows the electrician to work without supervision. Many go on to become master certified electricians, which requires additional education and professional experience.

Average Salary

The average starting salary is $34,445. With experience, they can possibly earn up to or over $67,279.

Important Skills

Business skills
Color vision
Manual dexterity
Critical thinking skills
Customer service skills
Troubleshooting skills

Elevator Mechanic

Elevator installers and repairers—also known as elevator mechanics—work to install, repair, and maintain elevator, escalator, moving walkway, and lift systems.

What Elevator Mechanics Do

Elevator mechanics need be able to read construction documents, plans, and specifications, which allows them to properly determine equipment needed to complete a project. After reading the plans, elevator mechanics begin their projects, whether those projects involve installing doors, repairing cables, or performing the overall daily maintenance of a system. Mechanics also need to ensure that these systems comply with all safety regulations and building codes. Given the importance of these systems for the public, elevator mechanics have to be able to locate malfunctions and repair them quickly, for any delays can significantly affect the building occupants.

Both repairing and installing elevators require knowledge of electrical systems. Elevator mechanics may install control panels and electric motors by using testing equipment such as ammeters and voltmeters to diagnose electrical problems.

Mechanics also need to adjust counterweights, safety controls, and door mechanisms once repairs and installations are complete. Then, they must test the system to ensure it works properly.

To make sure that systems are properly updated and evaluated, elevator mechanics need to complete service records, which list all repairs.

Most elevator mechanics specialize in a certain area—for example, maintenance and installations. Mechanics specializing in maintenance usually work on the same systems for extended periods. Other specialists include the following:

Adjusters- focus on fine-tuning all equipment after installation and ensure that the system works properly and, in the case of elevators, stops on each floor in a specified amount of time. Adjusters need thorough knowledge of electronics, electricity, and computers to ensure that newly installed elevators operate properly.

Assistant mechanics- must complete 4 years of their 5-year apprenticeships. When they are fully trained, however, they will work with someone who has completed the apprenticeship and earned a journeyman's license.

Work Environment

Mechanics normally work inside buildings. For maintenance and troubleshooting, they may work alone, whereas teamwork is required for major repairs and new installations.

Note that the work of elevator mechanics may be risky. Protective clothing must be worn, and all safety procedures must be followed.

Elevator mechanics work full-time, sometimes on evenings and weekends. Since they may work in office buildings or areas open to the public, working early or late shifts may be required. Overtime may be necessary, especially when working on new construction projects.

It is common for elevator mechanics to be on-call for emergency repairs. Usually, they are on a call schedule, where workers take turns being on-call for a week or a weekend.

Nearly all elevator installers and repairers learn by way of an apprenticeship. In the United States, currently 35 states require elevator mechanics to be licensed, the requirements for which can be obtained from the particular state's Department of Licensing, Labor, and Regulation.

Becoming an Mechanic

A high school diploma or equivalent is required to become an elevator mechanic. High school coursework that includes mathematics, mechanical drawing, and the industrial arts may help applicants prepare for apprenticeship positions.

Being an elevator mechanic is considered a trade career that generally requires an apprenticeship.The chief requirement to commence an apprenticeship is a high-school diploma or equivalent. Elevator apprenticeships are unique and last 5 years before a journeyman's license is earned.

However, elevator mechanics are some of the highest paid tradespeople, and many elevator mechanics go on to become master certified, which requires continued education and professional experience. Ongoing training is important for elevator installers and repairers in order to keep apprised of new technology.

Average Salary

The average starting salary is $68,660. With experience, they can possibly earn up to or over $88,295.

Important Skills

Attention to detail
Mechanical skills
Physical stamina
Physical strength
Troubleshooting skills

Plumbers & Steamfitters

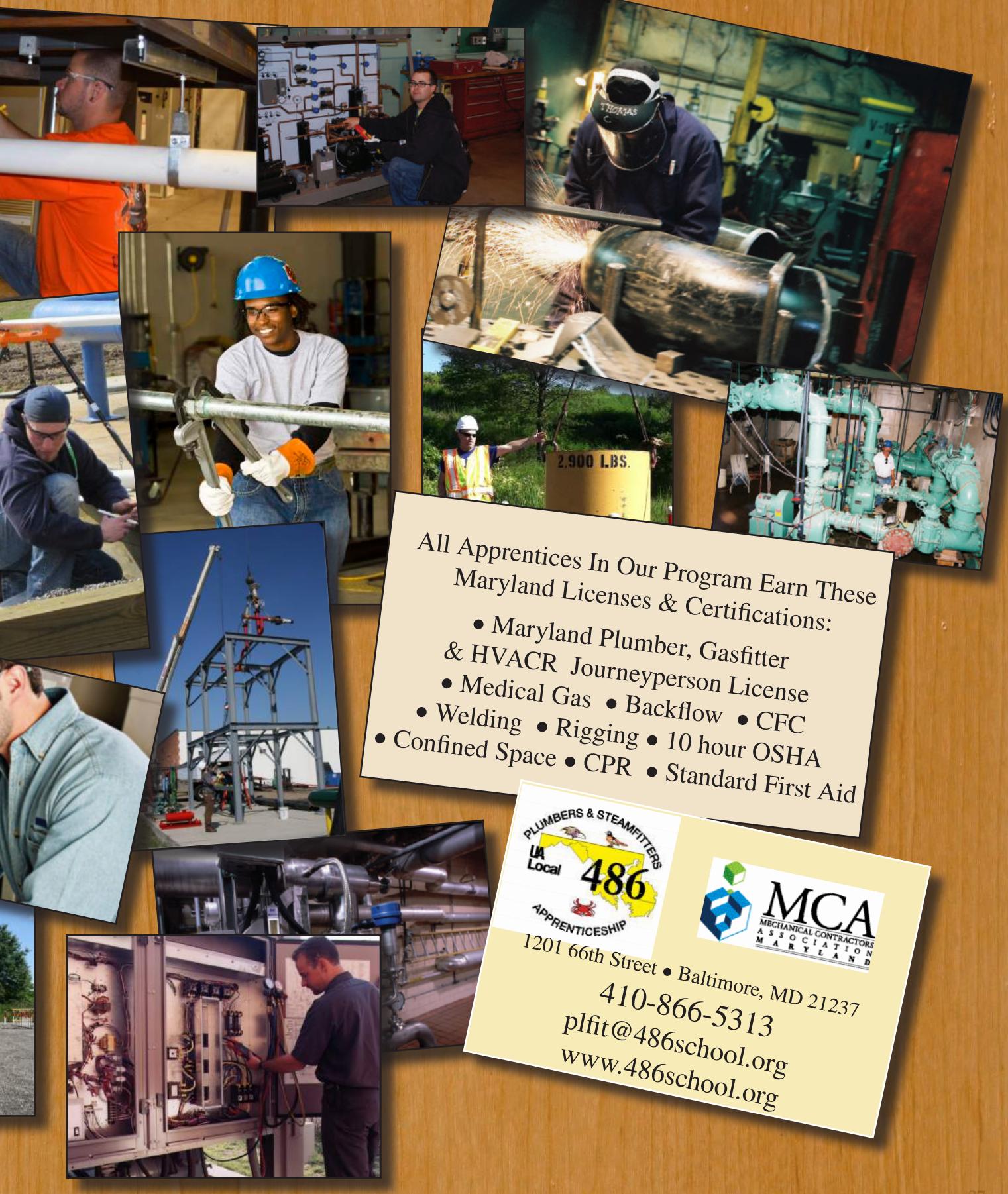
Local 486 Apprentices are mentored by skilled and licensed journey workers both in the classroom and on the job. Throughout the 5-year program, Apprentices are employed by a contractor from the Mechanical Contractors Association of Maryland, earning wages and benefits. Apprentices will receive a strong education in safety and basics of the trade. In the 3rd year, you choose a specific curriculum to pursue as a Plumber, Steamfitter, Welder or HVACR Technician.

A graduate from this program will then have a career making 100K total package.

"The Community College of Baltimore County's long partnership with Plumbers & Steamfitters Local 486 supports a strong opportunity to earn money, obtain college credit and a solid credential for a job"

Sandra L. Kurtinitis, Ph.D.
President, CCBC

Apprenticeship Program



All Apprentices In Our Program Earn These Maryland Licenses & Certifications:

- Maryland Plumber, Gasfitter & HVACR Journeyperson License
- Medical Gas
- Backflow
- CFC
- Welding
- Rigging
- 10 hour OSHA
- Confined Space
- CPR
- Standard First Aid

PLUMBERS & STEAMFITTERS
UA Local 486
APPRENTICESHIP

MCA
MECHANICAL CONTRACTORS ASSOCIATION MARYLAND

1201 66th Street • Baltimore, MD 21237
410-866-5313
plfit@486school.org
www.486school.org

Equipment Operator

Equipment operator is the general term for all careers involving driving, maneuvering, and controlling heavy machinery, including cranes, pavers, excavators, and loading machines.

What Equipment Operators Do

Although a variety of machinists fall into this category, most operators have similar duties. For example, they must ensure that all equipment functions properly for safe operation. They also clean, maintain, and make basic repairs to machines and are responsible for reporting any problems to their supervisors. To operate these machines, operators need to be able to push pedals, move levers, and turn valves; many of these positions also require special certifications to operate the machinery. Equipment operators have to be able to learn hand signals so that they can easily interact with other crew members.

The following are examples of types of construction equipment operators:

Operating engineers - work with loading machines such as bulldozers, excavators, and trenchers; they may also drive forklifts and industrial tractors.

Paving and surfacing equipment operators- work with machines devoted to paving asphalt and smoothing concrete for roadways or structures.

Asphalt spreader operators- operate asphalt spreaders by turning the valves and regulating temperatures as asphalt is spread onto roadways; this specialization requires careful concentration in order to accurately control the flow.

Concrete paving machine operators - operate machines used to spread and level wet concrete; they control levers and turn hand wheels and need to watch the surface of the concrete carefully to identify low spots.

Tamping equipment operators - use machines that compact soil for roadways and construction sites; they may also use machines that break up rocks or drive posts.

Pile driver operators - control machinery to drive large beams made of concrete, steel, or wood, into the ground; operators work on offshore oil rigs.

Material moving machine operators - use cranes to arrange construction materials.

Work Environment

Equipment operators work outside in every type of weather and temperature. Depending on the project and specialization, some operators even work in tunnels or offshore. Only 3% of all equipment operators are self-employed.

Note that equipment operators may face risks while fulfilling their duties, as well as injury. They need to wear protective clothing and follow all safety procedures.

Most operators work full-time. Needing to work around the schedules of other contractors, they may need to fulfill

irregular schedules. Some projects may proceed 24 hours a day, whereas others can only be completed before or after certain hours—for example, to avoid highway rush hour.

Becoming an Operator

To properly operate machines, equipment operators need excellent hand–eye–foot coordination. Being a machine operator is considered to be a trade career, although some operators learn on the job. Many operators start their careers by learning techniques on smaller equipment or being supervised by a more experienced operator. Machines controlled by electronics and hydraulics require greater skill and possibly certification; however, a large number of operators complete an apprenticeship or attend technical school.

The chief requirement to commence an apprenticeship is a high-school diploma or equivalent. Many operators attend technical school with programs that can offer specific certifications and training that counts as credit toward completing an apprenticeship. Once an apprenticeship is completed, a journeyman's license is issued, and the worker can start to operate machinery without supervision.

Equipment operators may need a commercial driver's license in order to drive the trucks that haul their machines. However, state laws vary regarding requirements for these licenses. Information about such laws and requirements can be obtained from each state's Department of Motor Vehicles.

Average Salary

The average starting salary is $30,614. With experience, they can possibly earn up to or over $44,026.

Important Skills

Hand–eye–foot coordination
Mechanical skills
No fear of heights

HVAC Mechanic

Heating, ventilation, and air conditioning (HVAC) mechanics, who may also work with refrigeration, install and maintain systems that control the temperature, airflow, and air quality in buildings.

What HVAC Mechanics Do

HVAC mechanics must understand how to read construction documents, plans, and specifications. HVAC systems are highly complex and are some of the first materials that contractors analyze in order to estimate the duration and cost of a project. Mechanics install or repair systems, which once completed may require water or fuel supply to be connected, as well as air ducts and other pieces that make the entire system work. Given new standards for buildings, HVAC mechanics may also check energy use and suggest ways to improve the system's efficiency.

Some HVAC mechanics oversee an electrician or install electrical wiring and controls, then test the entire system. Many mechanics are assigned to a certain project's system and are responsible for all repairs and routine maintenance. In the event of a malfunction, they need to determine the cause and to repair any worn or defective parts. Mechanics are normally either installers or repairers, depending on their skill set. Some mechanics specialize in a certain area such as solar panel systems or commercial refrigeration systems. Mechanics need to know and understand all required government regulations, including how to handle and dispose of certain fluids and gases.

Work Environment

Most HVAC mechanics are employed full-time by a company, though roughly 9% are self-employed. Evening and weekend work is sometimes required, and overtime may be necessary to address serious issues and deadlines. Many locations are assigned via contracts, by which mechanics work in one location for a certain period, be that a week or a year. Others may travel to different sites during the day to make service calls. Most HVAC mechanics work in indoor environments yet may have to go outside to check systems. Since most systems are in small spaces, cramped work conditions are common. If an air or heating systemal malfunctions, temperature may vary while working inside the building.

HVAC mechanics face many risks while fulfilling their duties, as well as injury. They must wear protective clothing and follow all safety procedures.

Becoming an HVAC Mechanic

Being an HVAC mechanic is considered to be a trade career that generally requires an apprenticeship. The chief requirement to start an apprenticeship is a high-school diploma or equivalent, though many aspiring HVAC mechanics attend technical school, where programs may offer specific certifications and training thatcounts as credit toward an apprenticeship.

Apprenticeships usually last 3–4 years before a journeyman's license is awarded, which allows a mechanic to work without supervision. Many HVAC mechanics go on to become master certified, which requires continued education and career experience. Mechanics who work with refrigerants are required by the US Environmental Protection Agency to be certified. Many trade schools and apprenticeships add this program to their courses of study.

Average Salary

The average starting salary is $35,852. With experience, they can earn up to or over $60,694.

Important Skills

Customer service skills
Attention to detail
Mechanical skills
Physical strength
Time management skills
Troubleshooting skills

Choose The Union HVAC Technician Apprenticeship Training Program

- Apprentice wages & fringe benefits starting at $50,000/year
- Guaranteed annual 10% wage increase
- Graduates make $100K in wages and benefits
- Fringe benefits include Medical, Pension and 401K
- Five-year program includes on-the-job training and 6+ hours per week of school
- FREE education & training
- 30 college credits upon completion
- Three training facility locations

"This area of service is expected to grow more than 30% in the next several years."
--Chris Haslinger, UA National Training Director

MCA
MECHANICAL CONTRACTORS ASSOCIATION MARYLAND

PLUMBERS & STEAMFITTERS
UA Local 486
APPRENTICESHIP

1201 66th Street • Baltimore, MD 21237
410-866-5313
plfit@486school.org
www.486school.org

Interior Designer

Interior designers help to make functional spaces that are safe and beautiful. They specify and select materials, finishes, lighting, furniture, and decorations to create and ambiance (the way a room feels to the user).

What Designers Do

Interior designers must understand a client's goals and expectations for a project. Once they have the information that they need, interior designers develop layouts. They collaborate with architects, engineers, and builders to help ensure that everything is correct.

Once the final plans have been approved, interior designers enter designs into software such as computer-aided design (CAD) or building information modeling programs. They next determine a timeline and project costs. Once interior designers have ordered everything and prepared it to be put into place, they oversee all installations. After everything is in place, they ensure that clients are satisfied and, if not, make any necessary changes.

Many interior designers specialize in a particular type of building (e.g., homes, hospitals, and hotels), a specific room (e.g., bathrooms and kitchens), or a specific style (e.g., Art Deco). Some interior designers work for home furnishing stores by providing design services to help customers to choose materials and furnishings.

The following are examples of types of interior designers:

Sustainable designers use green and sustainable materials.

Universal designers focus on designing spaces that can be used by everyone, including the elderly and people with disabilities.

Kitchen and bath designers focus on kitchen and bathroom design.

Lighting designers design lighting layouts to suit specific spaces.

Work Environment

Interior designers usually work full-time, though their schedules may vary depending on the client's needs. Roughly 25% of designers are self-employed, which often means meeting stringent deadlines and working on weekends. Travel may be required to meet clients at jobsites.

Becoming a Designer

Designers usually have a bachelor's degree, though that degree does not have to be in interior design. Many design-oriented workers end up in the field after working in other careers. More often than not, CAD, interior design, and drawing classes are recommended. Multiple interior design degrees are available, including associate's, bachelor's, and master's degree.

In the United States, licensing for designers varies from state to state. Some states stipulate that only someone with a license may be called an interior designer, though all designers can perform interior design work.

Average Salary	Important Skills
The average starting salary is $27,395. With experience, they can possibly earn up to or over $62,543.	Artistic ability Creativity Attention to detail Interpersonal skills Problem-solving skills Visualization skills

For over 100 years, North America's Building Trades Unions and its signatory contractors have funded and operated a skilled craft apprenticeship system that is the envy of the world.

BUILD UNION
EST. 1913
UNION APPRENTICESHIPS
"Earn While you Learn"

Apprenticeship and workplace-based training is an "earn while you learn" system that offers young people the chance to learn from the best trained construction workers in North America. When they complete their apprenticeship, they also have a portable, nationally recognized credential that they can take anywhere in the country, one that comes with good pay and benefits that will support them and their families.

An additional important feature is that most apprenticeship programs have been assessed for college credit, which participants can apply toward an associate's or bachelor's degree.Without a doubt, apprenticeship is the "other four-year degree."

For information call (202) 756-4660 or visit www.choiceworks.org

SCHOOL OF APPLIED AND INFORMATION TECHNOLOGY

CONSTRUCTION MANAGEMENT

Construction Management
A.A.S. Degree and Certificate

Construction Craft Professional
A.A.S. Degree Certificate

For more information contact:
CCBC Catonsville
Professor **Greg Case**, *Program Coordinator*
443-840-4110
or gcase@ccbcmd.edu

SEE WHAT YOU CAN BE

CCBC

The incredible value of education. **www.ccbcmd.edu**

Ironworker

Structural iron and steelworkers, or ironworkers, install beams and columns of structures for buildings, bridges, and any other structures using steel or iron materials.

What Ironworkers Do

Ironworkers unload and stack prefabricated steel to be lifted by cranes. As beams and columns are lifted into place, ironworkers guide the pieces into position. They also signal to crane operators when pieces are in position and help with alignment. Once all pieces are in place, ironworkers verify vertical and horizontal alignments and connect all pieces together by fastening them with bolts and welds. Although most jobs performed by ironworkers involve new buildings, some ironworkers may also help to disassemble older buildings and bridges either being demolished or repaired.

Some ironworkers are known as assemblers and fabricators, who create prefabricated steel and iron pieces before sending them to construction sites. A rod buster creates steel mesh cages from rebar to be used in concrete floors, wall, beams, and footings.

Work Environment

Most ironworkers work full-time. Some may have to work at great heights using harnesses and saftey equipment. Ironworkers work in all kinds of weather, though projects may be postponed due to extreme weather or temperature. Some ironworkers may also work inside warehouses or factories.

Ironworkers can face risks to accomplish their jobs, as well as the possibility of injury. They must wear protective clothing and follow all safety procedures.

Becoming an Ironworker

A high school diploma or equivalent is required. Coursework in mathematics, industrial arts, plan reading, and welding can be particularly useful.

Being an ironworker is considered to be trade career that generally requires an apprenticeship. Although the chief requirement to commence an apprenticeship is a high school diploma or equivalent, many aspiring ironworkers attend technical school. These schools offer programs that may provide specific certifications and training that can even count as credit toward completing an apprenticeship.

Apprenticeships usually last 3–4 years before a journeyman's license is awarded, which allows an ironworker to work without supervision. Many ironworkers go on to become master certified, which requires continued education and experience.

Although not required, some ironworkers become certified welders by the American Welding Society. Certifications in welding, rigging, and crane signaling may increase a worker's value and result in higher pay.

Average Salary

The average starting salary is $32,455. With experience, they can earn up to or over $56,238.

Important Skills

Excellent balance
Depth perception
Physical stamina
Physical strength
No fear of heights

Mason

Masons constitute a general group of specialized workers, including brickmasons, blockmasons, and stonemasons. They use brick, concrete, and stones for building foundations, walkways, chimneys, or retaining walls.

What Masons Do

Masons need to know how to read construction documents, plans, and specifications in order to perform their jobs correctly. They must be able to understand plans so that they can correctly calculate the amount and cost of materials needed to complete projects.

As well as building basic projects, masons lay out intricate patterns and foundations. All projects begin by cutting materials, mixing mortar or grout, and planning instructions. Once everything is laid out and in place, masons clean up any excess mortar, as well as fill in joints and polish surfaces.

The following are examples of types of masons:

Brickmasons and blockmasons (i.e., bricklayers) work specifically with bricks and concrete blocks.

Refractory masons restore and replace furnaces, kilns, and basins; they work with high-heat bricks and ceramic.

Stonemasons work with natural and artificial stone.

Cement masons pour and smooth out foundations and concrete.

Work Environment

Masons commonly work outdoors and in all types of buildings. Building construction today uses stone, brick, marble, and a variety of other materials are being used, which means that the commercial masonry industry is growing. Most masonry work is performed outside, with weather playing a role in work schedules. Most masons work full-time, yet may need to adjust their schedule or work overtime in order to meet deadlines. Masonry work may be stopped during extreme temperature or weather. Some masons are self-employed, though the majority work for contractors.

Becoming a Mason

Masons are normally required to complete an apprenticeship in order to begin their careers. However, some masons gain experience as assistants. Others attend a technical school to earn a degree, the credit of which can be used toward completing an apprenticeship. Although many ways to become a mason are available, a high-school diploma or equivalent is required.

Average Salary

The average starting salary is $31,427. With experience, they can possibly earn up to or over $47,021.

Important Skills

Hand–eye coordination
Mathematical skills
Physical stamina
Physical strength
Visualization skills

Build a Bright Future

Offering the latest in construction techniques and technology through classroom instruction and hands-on training for 21 trades.

- Carpentry
- Cement Mason
- Concrete Form Builder
- Drywall
- Electrical
- Glazier
- Heavy Equipment Operator
- HVAC
- Laborer
- Masonry
- Painting
- Pipefitting
- Pipe Insulator
- Plumbing
- Reinforced Ironwork
- Roofing
- Sheet Metal
- Sprinkler Fitting
- Steam Fitting
- Structural Ironwork
- Welding

ABC
Associated Builders and Contractors, Inc.

Approved and Accredited by:

- ✓ National Center for Construction Education and Research (NCCER)
- ✓ U.S. Department of Labor
- ✓ Maryland Apprenticeship and Training Council
- ✓ D.C. Apprenticeship Council
- ✓ Veterans Administration

ABC Baltimore
info@abcbaltimore.org
abcbaltimore.org
410.821.0351

ABC Chesapeake Shores
cgarvey@abc-chesapeake.org
abc-chesapeake.org
410.267.0347

ABC Cumberland Valley
kathy@abccvc.com
abccvc.com
301.739.1190

ABC of Metro Washington
info@abcmetrowashington.org
abcmetrowashington.org
301.853.4668

Mechanical Engineer

Mechanical engineering is one of the broadest careers in engineering. These engineers design and develop mechanical and thermal devices such as turbines, engines, and power plants. They also design elevator and conveyor systems.

What Mechanical Engineers Do

Mechanical engineers analyze projects and problems to determine whether a mechanical or thermal design could help to resolve the problem at hand. They rely on computer programs to run analyses and simulations, as well as to design systems. Once they determine the correct specifications, they can develop prototypes to test outside computer systems and implement any necessary changes.

Mechanical engineers also oversee the process of creating devices to ensure that they are made correctly.

Work Environment

Most of a mechanical engineer's work is performed in an office. However, engineers may travel to worksites in order to observe how their design is progressing. Nearly all mechanical engineers work with a team of other engineers and professionals. A 40-hour work week is typical for this career, though one in three mechanical engineers work more hours.

Becoming a Mechanical Engineer

Aspiring mechanical engineers need to obtain a bachelor's degree from an Accreditation Board for Engineering and Technology (ABET) approved College or university. Most of these engineers go on to receive their master's degree in order to perform research. All mechanical engineers must be licensed to work; such licensure allows them to become Professional Engineers, a position requiring a degree from an accredited program, at least 4 years of relevant work experience, and a passing score on the final examination.

To become a teacher, conduct research, or advance in the field, a master's degree is usually required. Many mechanical engineers earn additional degrees in engineering or business administration.

Average Salary

The average starting salary is $61,299. With experience, they can possibly earn up to or over $115,039.

Important Skills

Creativity
Listening skills
Mathematical skills
Mechanical skills
Problem-solving skills

Plumber

Plumbers, pipefitters, and steamfitters install and repair piping that carries liquids or gases in residential, commercial, and industrial locations.

What Plumbers, Pipefitters, and Steamfitters Do

As with most professions in the construction industry, plumbers must read and understand construction documents, plans, and specifications. They also need to follow state and local regulations, as well as building codes. Reading plans allows these workers to estimate how much material is needed and the type of equipment necessary for its installation. As well as installing pipelines, plumbers also inspect and repair systems to ensure that they run properly and troubleshoot problems. They also periodically replace old parts.

Although plumbers, pipefitters, and steamfitters are three distinct specialties, their duties are often similar. Master plumbers who have gained years of experience in the field may develop a plumbing layout for new construction projects. Their experience and input ensures the project meets code and is accomplished within budget.

The following are examples of types of plumbers, pipefitters, and steamfitters:
Gasfitters
Plumbers
Pipefitters
Sprinklerfitters
Steamfitters

Work Environment

Work locations for these occupations vary due to the immense amount of piping systems, though the most common locations are homes, factories, and businesses. Since plumbing often occupies confined spaces, Plumbers may need to be able to squeeze into tight spaces. They also need to travel to worksites.

Although most plumbers work indoors, some work outside as well, regardless of the weather.

Plumbing positions are usually full-time jobs that can include work on nights and weekends and being on-call for emergencies. Overtime is common, especially to meet project deadlines. Around 11% of plumbers are self-employed, which allows them to set their schedules.

Becoming a Plumber

Careers in plumbing normally require the completion of an apprenticeship, though some have gained experience as assistants. Others attend technical school to earn a degree, the credits of which can be used toward completing an apprenticeship. Although many routes to become a plumber are available, a high-school diploma or equivalent is required, as is licensing in many US states.

Many technical schools are available for general or specialized training. Technical schools offer courses on pipe system design, safety, and tool use, as well as welding courses considered to be necessary by some pipefitter and steamfitter apprenticeship training programs.

Most plumbers, pipefitters, and steamfitters learn their trade during a 4–5-year apprenticeship. With additional coursework and several years of plumbing experience, plumbers can become eligible to earn master status.

Average Salary
The average starting salary is $36,764. With experience, they can possibly earn up to or over $66,425.

Important Skills
Business skills
Customer service skills
Mechanical skills
Physical strength
Troubleshooting skills

Choose The Plumbers & Steamfitters Union Apprenticeship Training Program

- Apprentice wages & fringe benefits starting at $50,000/year
- Guaranteed annual 10% wage increase
- Graduates make $100K in wages and benefits
- Fringe benefits include Medical, Pension and 401K
- Five-year program includes on-the-job training and 6+ hours per week of school
- FREE education & training
- 30 college credits upon completion
- Three training facility locations

"By 2020, the need for licensed and certified plumbers will increase by 26%."
--William Hite, UA General President

MCA
MECHANICAL CONTRACTORS ASSOCIATION MARYLAND

PLUMBERS & STEAMFITTERS UA Local 486 APPRENTICESHIP

1201 66th Street • Baltimore, MD 21237
410-866-5313
plfit@486school.org
www.486school.org

Professional Occupations

You don't have to have a construction background to be in the built environment field. Construction firms are often multi-million dollar a year enterprises that need professional staff to operate successfully. Here are examples of other professions vital to the industry:

Accounting and Finance: Built environment companies are in charge of complex projects with equally complex financing and accounting standards. Each project becomes its own multi-million dollar business which requires a lot of people with training and education in accounting and finance.

Administrative Support: As with any business, built environment companies need secretaries, bookkeepers and receptionists that perform crucial functions to the success of the business.

Dispatching: Many built environment businesses have large fleets of vehicles for installation and maintenance of products. Vehicle fleets can be on call 24-7 and dispatchers ensure proper customer care, technician staffing and vehicle maintenance.

Human Resources: Built environment companies often need to hire lots of people with the right skills to do the jobs correctly. This is a critical element to the success of projects.

Information Technology: Probably one of the single fastest growing segments of the industry; IT professionals create internal systems and integrate mobile platforms for communications between the field and office staffs.

Legal: With the complexities of projects, construction lawyers are in demand to work through legal issues, negotiate contracts, mediate disputes and often litigate outcomes.

Marketing and Communications: Work with construction companies to create and maintain websites and social media feeds, jobsite photography, issue press releases, coordinate advertising and assemble bid packages to secure new work.

So before you go out looking for a job or an education pathway, consider the built environment industry…your dream job may be closer than you think.

Real Estate Developer

Developers deal with all things related to purchasing land for residential, commercial, and industrial use. Position requirements include negotiating land purchases, achieving zoning approval, obtaining permits, and overseeing budgets and sales teams.

What Developers Do

Real estate developers are often the leaders in building projects and must understand networking, communication, finacing, design, construction, regulations and property management.

If real estate developers find a property with potential, then they must determine its ideal use. They research whether the area needs restaurants or shopping centers, or whether the area will become a shipping port needing structures for industrial use. Once real estate developers have decided to purchase land, they have to find investors and funding in order to pay for its development.

Many developers work with architects and engineers to create designs and plans, during which time they have to ensure that the land is zoned for what they seek to create; otherwise, rezoning is required. Real estate developers also need to bear in mind whether the area is historically preserved in any way. Ultimately, developers hire general contractors to build the structures. Once the land has been developed, developers may work with real estate agents to sell or lease the property.

Becoming a Developer

Real estate developers come from a variety of backgrounds. It is common for people with business or engineering degrees to transition into becoming developers. Many postsecondary degrees in real estate development are also available.

Average Salary	Important Skills
The average starting salary is $34,584. With experience, they can earn up to or over $125,127.	Analytical skills Financial skills Organizational skills Marketing skills Design skills

ACE MENTOR PROGRAM
ARCHITECTURE • CONSTRUCTION • ENGINEERING

Benefits
the Design and Construction Industry

One of a Kind

ACE stands apart from other educational/workforce programs aimed at the design and construction industry.

ACE:

- Targets **high school students** just as they seriously start to explore career options.
- Teaches students about the **entire** process of designing and building a project.
- Relies exclusively on **passionate industry professionals** to excite and mentor students.
- Launched and driven by **all A/E/C industry sectors to serve their needs.**
- To learn more, visit **www.acementor.org**

Sheet Metal Worker

Sheet metal workers make or install products made of thin metal sheets. Sheet metal is thin steel, aluminum, or another alloy metal. Examples of products made by metal workers include HVAC ducts, metal roofing, siding, and gutters.

What Sheet Metal Workers Do

Metal workers select the required type of metal according to the product plans. They will measure and mark all dimensions and reference lines on the metal sheets, then drill holes where screws, bolts, or rivets will be placed. If manufacturing a product in a plant, they then install the metal sheets on supportive frameworks. If installing on a jobsite, they will fabricate the product there. One the product is in place, sheet metal workers will fasten the seams and joints by welding, soldering, bolting, or riveting. Sheet metal workers may also install nonmetallic materials like fiberglass and plastic board.

The following are examples of sheet metal workers:
Fabrication sheet metal workers
Installation sheet metal workers
Maintenance sheet metal workers
Testing and balancing sheet metal specialists

Work Environment

Most sheet metal workers are employed full-time, usually in shops or manufacturing plants. When on a jobsite, sheet metal workers sometimes have to work at great heights. They work in all kinds of weather, though projects may be postponed due to extreme weather or temperature.

Note that sheet metal workers face risks to accomplish their jobs, as well as the possibility of injury. Sheet metal workers must wear protective clothing and follow all safety procedures.

Becoming a Metal Worker

A high-school diploma or equivalent is required. Coursework in algebra, geometry, and general vocational education courses including plan reading, mechanical drawing, and welding can be particularly useful.

Being a sheet metal worker is considered to be trade career that generally rquires an apprenticeship. Although the chief requirement to commence an apprenticeship is a high-school diploma or equivalent, many aspiring sheet metal workers attend technical school. These schools offer programs that may provide specific certifications and training that can even count as credit toward completing an apprenticeship.

Apprenticeships usually last 3–4 years before a journeyman's license is awarded, which allows a metal worker to work without supervision. Many metal workers go on to become master certified, which requires continued education and career experience.

Although not required, some sheet metal workers become certified welders by the American Welding Society, the International Training Institute for the Sheet Metal and Air Conditioning Industry, and The Fabricators & Manufacturers Association, International. Certifications in welding, rigging, and crane signaling may increase a worker's value and result in higher pay.

Average Salary

The average starting salary is $33,242. With experience, they can earn up to or over $57,352.

Important Skills

Computer skills
Dexterity
Math skills
Mechanical skills
Physical stamina
Physical strength

THE INTERNATIONAL ASSOCIATION OF SHEET METAL, AIR, RAIL AND TRANSPORTATION LOCAL UNION 100 - SM

Requirements for Apprenticeship Program

- **18 years of age**
- **Physically fit to perform the work of the sheet metal trade**
- **Negative Drug Test prior to acceptance**
- **Reliable transportation**
- **Ability to work in all weather conditions**

Apprentice and Journeyman Training Programs

State Certified apprentice training Programs (5-year day program)

Combination of on- the- Job Training and classroom instruction

Excellent Benefits and Great Pay

- **Health Plan**
- **Dental Plan**
- **Vision Plan**
- **Prescription Drug Plan**
- **Pension Plan**
- **401K Plan**
- **Vacation time**
- **Make over $80,000 year, not including Benefits package**

Responsibilities of a Sheet Metal Worker:

- Fabricates, installs, and repairs sheet metal products in industry
- Plans installation according to job blueprints or drawings
- Use Specialized Tools and Machinery
- Welds and solders materials for related projects such as heating and air conditioning systems
- Works on air pollution control systems and solar energy
- Maintains hands-on work ethic in all weather conditions
- Completes projects both large and small
- Completes additional journeyman training to further their career

Work area covered: The District of Columbia, Maryland and Northern Virginia.Travel is required.

Contact Recruitment at 301-568-8655 Ext 3 for more information.
Emails can be sent to recruiter@smart100.org

SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION MID-ATLANTIC CHAPTER

Welders

In short, welders join metal parts together. They also fill in holes and seams by using high-heat joint equipment. Given the strength of these joints, welders commonly work on ships, cars, and building structures.

What Welders Do

Welders use construction documents, plans, specifications, and sketches to understand the tasks involved in a project. They calculate the dimensions that they need and inspect structures. Using high-heat torches, they permanently join metal together, while monitoring equipment eliminates overheating or material malfunction.

Work Environment

Welders normally work full-time, although shifts may vary. Some manufacturing companies run shifts for 8–12 hours, with overtime being common. Many welders work outside and in buildings. Some specially trained welders even work underwater.

Becoming a Welder

Welders require special training. Some welders complete a few weeks of classes, while others complete postsecondary coursework; others may also combine training and work experience. Many secondary-level technical schools allow aspiring welders to take certification tests, and further training is available in postsecondary institutions such as vocational–technical institutes, community colleges, and private welding, soldering, and brazing schools. The US Armed Forces also maintains welding and soldering schools. Although not always required, many companies require welders to be certified, which can be done via an apprenticeship or at technical school.

Average Salary

The average starting salary is $32,380. With experience, they can possibly earn up to or over $54,259.

Important Skills

Attention to detail
Manual dexterity
Physical stamina
Physical strength
Spatial orientation
Technical skills

Choose The Union Welder Apprenticeship Training Program

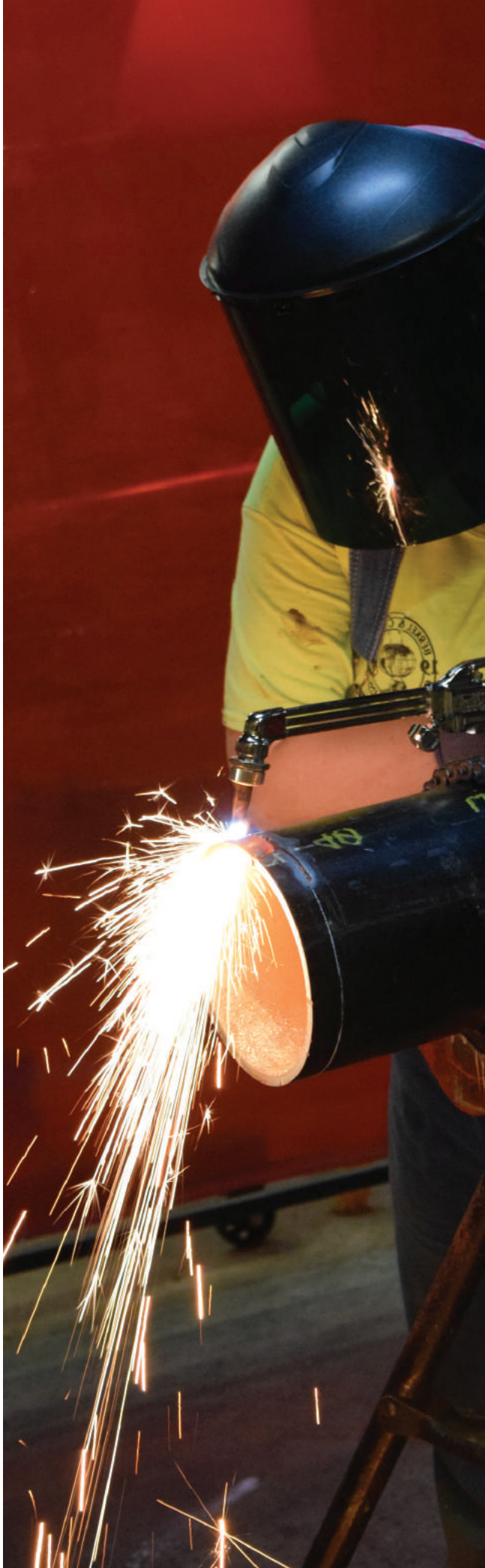
- Apprentice wages & fringe benefits starting at $50,000/year
- Guaranteed annual 10% wage increase
- Graduates make $100K in wages and benefits
- Fringe benefits include Medical, Pension and 401K
- Five-year program includes on-the-job training and 6+ hours per week of school
- FREE education & training
- 30 college credits upon completion
- Three training facility locations

A skilled and certified welder is always in demand to build a secure energy system.
--William Welsh, Plumbers & Steamfitters #486 Business Manager

MCA
MECHANICAL CONTRACTORS ASSOCIATION MARYLAND

PLUMBERS & STEAMFITTERS UA Local 486 APPRENTICESHIP

1201 66th Street • Baltimore, MD 21237
410-866-5313
plfit@486school.org
www.486school.org



Maryland Directory

The following is a list of Built Envionrment education programs available in Maryland. Some of these programs are not accredited. Contact the individual school or program for more information.

Pre-Apprenticeship Programs

ACE Mentorship
www.acementor.org/affiliates/maryland

Civic Works
www.civicworks.com
410-366-8533
Baltimore, MD 21213

Job Opportunities Taskforce
www.jotf.org
410-234-8040
Baltimore, MD 21202

Living Classrooms
www.livingclassrooms.org
410-685-0295
Baltimore, MD 21231

Skills USA
www.mdskillsusa.org

Apprenticeship Programs

ABC Baltimore Metro
www.abcbaltimore.org
410-821-0351
Towson, MD 21286
Masonry, Carpentry, Electrical, HVAC, Environmental, Plumbing

ABC Chesapeake Shores
www.abc-chesapeake.org
410-267-0347
Annapolis, MD 21401
Electrical, HVAC, Plumbing

ABC Cumberland Valley
www.abccvc.org
301-739-1190
530 N. Locust Street
Hagerstown, MD 21740
Bricklayer, Carpentry, Cement Mason, Craft Laborer, Electrical, Glazier, Heavy Equipment Operator, HVAC-R, Insulation Worker, Painter, Pipefitter, Plumbing, Ironworker, Roofer, Sheet Metal, Sprinkler Fitter, Steamfitter, Welding

ABC Metro Washington
www.abcmetrowashington.org
301-595-9711
Beltsville, MD 20705
Bricklaying, Carpentry, Electrical, HVAC, Operating Engineer, Plumbing, Welding

Baltimore City Joint Apprenticeship Committee, AFSCME Local No. 44
410-545-3260
Baltimore, MD 21202
Carpentry, Electrical, HVAC, Insulation, Stationary, Water and Waste Treatment

Baltimore Electricians JATC Local Union No. 24
jatc24.org
410-247-3313
Baltimore, MD 21230
Electrical

International Union of Elevator Constructors, Local No. 7, JAC
www.trainbaltimore.org
410-661-1491
Baltimore, MD 21234
Elevator Constructor

Baltimore Sheet Metal Workers JATC Local Union No. 100
www.smart100.org
410-732-1849
Baltimore, MD 21205
Bricklayer, Carpentry, Electrical, HVAC, Insulation, Plumbing

Baltimore Sprinkler Fitters Local No. 536
www.sprinklerfitters536.org
410-747-0630
Baltimore, MD 21228
Sprinkle Fitting

Baltimore Operating Engineers
www.iuoe37.org
410-254-0219
Baltimore , MD 21222
Operating Engineering

Heating and Air Conditioning Contractors of Maryland, Inc.
www.haccmd.org
410-431-8889
Severna Park, MD 21146
HVAC

Heat and Frost Insulators and Allied Workers Local No. 24
www.insulators24.org
301-498-9162
Laurel, MD 20707
HVAC

Independent Electrical Contractors - Chesapeke
www.iecchesapeake.com
301-621-9545
8751 Freestate Drive, Suite 250
Laurel, MD 20723
HVAC, Electrical, Voice/Data/Video

International Union of Elevator Constructors, Local No. 10
iueclocal10.org
301-459-0497
Lanham, MD 20706
Elevator Constructor

Iron Workers Local No. 5
www.ironworkerslocal5dc.com
301-599-0960
Upper Marlboro, MD 20772

Ironworkers Local No. 16 Apprenticeship Program
410-282-6650
Baltimore, MD 21222
Welding

Maryland Plumbing, Heating, Cooling Contractors, Inc.
marylandphcc.org
410-461-5977
Ellicott City, MD 21043
Plumbing, HVAC

Mid-Atlantic Carpenters' Training Centers- Baltimore
mactc.net
410-737-9670
Baltimore, MD 21227
Carpentry

Plumbers and Steamfitters Local Union No. 486
www.ualocal486.com
410-866-5313
Baltimore, MD 21237
Plumbing, Steam Fitting, HVAC, Welding, Gas Fitting, Medical Gas and Backflow Prevention

Sprinkler Fitters Local No. 669
www.sprinklerfitters669.org
410-381-4300
Columbia, MD 21046
Plumbing

Steamfitters Local No. 602, JATC
steamfitters-602.org
301-341-1555
Landover, MD 20785
Pipe Fitting

Washington D.C. Joint Plumbing Apprenticeship Committee Local No. 5
www.local5plumbers.org
301-322-8810
Landover, MD 20785
Plumbing

Washington, D. C. Electricians Joint Apprenticeship and Training Committee Local Union No. 26
www.washdcjatc.org
301-429-2575
Lanham, MD 20706
Electrical

Community Colleges

Anne Arundel Community College
www.aacc.edu
410-777-2222
Arnold, MD 21012-1895
Electrical, Virtual Drafting & Design (CADD), Civil Engineering, Construction Management, Welding, Wiring

Baltimore City Community College
www.bccc.edu
410-462-8300
2901 Liberty Heights Avenue,
Baltimore, MD 21215-7807
Virtual Drafting & Design (CADD), Engineering transfer, Electrical Engineering, Construction Supervision

Carroll Community College
www.carrollcc.edu
410-386-8000
Westminster, MD 21157
Virtual Drafting & Design (CADD), Construction Management

Cecil College
www.cecil.edu
410-287-1000
One Seahawk Drive
North East, MD 21901
Engineering transfer

Chesapeake College
www.chesapeake.edu
410-822-5400
Wye Mills, MD 21679
Electrical, Virtual Drafting & Design (CADD), HVAC, Welding, Landscape Architecture

College of Southern Maryland
www.csmd.edu
301-934-2251
Multiple locations
Engineering, Construction Management, Virtual Drafting & Design (CADD), Electrical, Manufacturing

Community College of Baltimore County – Catonsville
www.ccbcmd.edu
443-840-4435
Baltimore, MD 21228
Civil Engineering, Electrical Technology, Virtual Drafting & Design (CADD), Home Inspection, Construction Management, Occupational Safety and Health Technology, Building Maintenance, Surveying

Community College of Baltimore County – Dundalk
www.ccbcmd.edu
443-840-3131
Baltimore, MD 21222
HVAC

Community College of Baltimore County - Essex
www.ccbcmd.edu
443-840-1732
Baltimore, MD 21237
Electrical Technology, Virtual Drafting & Design (CADD)

Fredrick Community College
www.frederick.edu
301-846-2400
Frederick, MD 21702
Electrical, Virtual Drafting & Design (CADD), Construction Management

Hagerstown Community College
www.hagerstowncc.edu
240-500-2000
11400 Robinwood Drive
Hagerstown, Maryland, 21742
HVAC, Plumbing, Welding, Metal Fabrication, Virtual Drafting & Design (CADD), Mechanical Engineering Tech. Engineering transfer, Geothermal energy installation, Alternative energy tech., Advanced manufacturing, Industrial tech.

Harford Community College
www.harford.edu
443-412-2000
Bel Air, MD 21015
Electrical, Virtual Drafting & Design (CADD), Welding, Project Management

Howard Community College
www.howardcc.edu
410-772-4944
Columbia, MD 21044
Electrical, Virtual Drafting & Design (CADD), Carpentry, Professional Management, Construction Management

Montgomery College
cms.montgomerycollege.edu
240-567-5000
Rockville, MD 20850
Civil Engineering, Electrical, Virtual Drafting & Design (CADD), Construction Management, Welding

Prince George's Community College
www.pgcc.edu
301-336-6000
Largo, MD 20774-2199
Electrical, Virtual Drafting & Design (CADD), Construction Management, Property Management

Wor-Wic Community College
www.worwic.edu
410-334-2800
32000 Campus Drive,
Salisbury, MD 21804
Construction Engineering Tech., Manufacturing Engineering Technology

4 Year Colleges

Capitol College
www.captechu.edu
800-879-3821
Laurel, MD 20708
Electrical Engineering

continued on next page...

Frostburg State University
www.frostburg.edu
301-687-4201
101 Braddock Road,
Frostburg, MD 21532
Engineering, Mechanical Engineering

Johns Hopkins University
www.jhu.edu
410-516-4050
Baltimore, MD 21218-2608
Engineering, Real Estate Development

Loyola University
www.loyola.edu
410-617-2000
Baltimore, MD 21210
Engineering

Maryland Institute College of Art
www.mica.edu
410-669-9200
1300 W. Mount Royal Ave.
Baltimore, MD 21217
Architectural Design

Morgan State University
www.morgan.edu
443-885-3333
Baltimore, MD 21251
Engineering, Architecture, Construction Management

Notre Dame Of Maryland
www.ndm.edu
410-435-0100
4701 North Charles Street
Baltimore, Maryland 21210
General Engineering with transfer to Johns Hopkins, UMD, or Columbia University

United States Naval Academy
www.usna.edu
410-293-1858
121 Blake Road,
Annapolis, MD 21402
Aerospace Engineering, Electrical Engineering, General Engineering, Mechanical Engineering, Naval Architecture & Marine Engineering, Ocean Engineering

University of Baltimore
www.ubalt.edu
410-837-5797
Baltimore, MD 21201
Real Estate Development

University of Maryland – Baltimore County
www.umbc.edu
410-455-1000
Baltimore, MD 21250
Engineering

University of Maryland – College Park
www.enme.umd.edu
301-405-2410
College Park, MD 20742
Engineering, Architecture, Project Management

University of Maryland Eastern Shore at Shady Grove
www.shadygrove.umd.edu
301-738-6214
Rockville, MD 20850
Construction Management

Washington College
www.washcoll.edu
410-778-2800
300 Washington Avenue
Chestertown, Maryland 21620
General Engineering with transfer to Columbia University for Dual Degree

MARYLAND CENTER for CONSTRUCTION EDUCATION & INNOVATION

Maryland Center for Construction Education & Innovation is an industry-led workforce intermediary established to create a world-class education system for Maryland's built environment. MCCEI identified three areas of focus to improve Maryland's construction workforce pipeline: 1). Generating career interest among young talent by changing the image of construction, 2). Aligning education with new technologies and skill sets and articulating programs from high school through university levels, 3). Increasing the supply of bachelor's degree construction graduates produced in Maryland. For more information about MCCEI visit, **www.mccei.org** or call us at **410-704-5981**.

Sources

Information about Careers : United States Bureau of Labor Statistics Occupational Outlook Handbook http://www.bls.gov/ooh/

Salary Information : Maryland Department of Labor, Licensing & Regulation Occupational Employment and Wages http://www.dllr.state.md.us/lmi/wages/toc001.htm

LEARN

IT PAYS TO TRAIN FOR A CAREER IN ELECTRICAL CONSTRUCTION

Apprenticeship graduates earn up to

$84,800

a year, plus benefits working 2,000 hrs. per year.

It's a smart career transition for veterans and you get paid while you study! Earn great benefits with opportunities for advancement. A college degree isn't required–apply now!

Call **301-429-2575** or visit
www.getchargedup.org

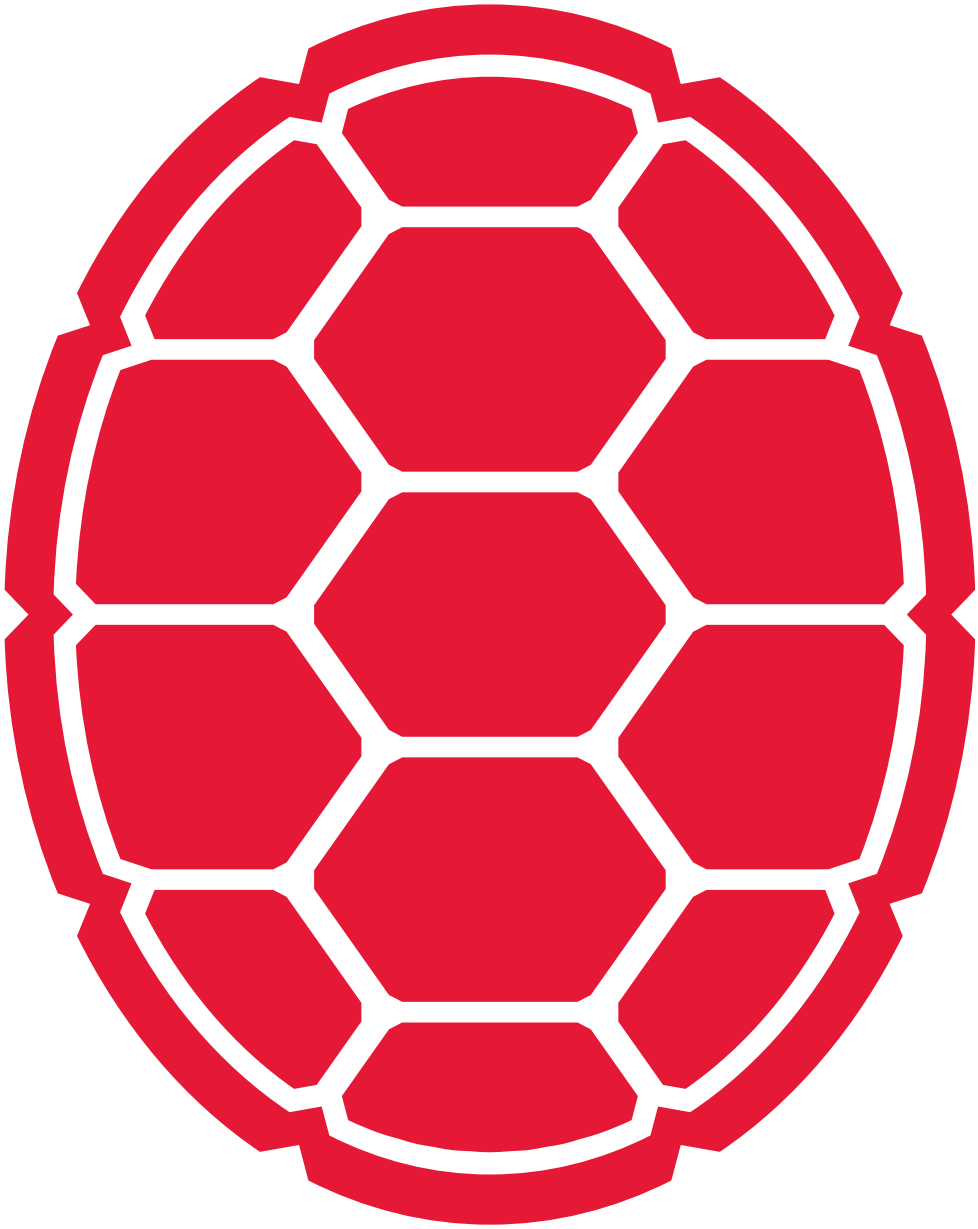
twitter.com/DCElec_Alliance
facebook.com/ElectricalAlliance

THE ELECTRICAL ALLIANCE

Local 26 IBEW and National Electrical Contractors Association
200 Contractors and 8,000 Electricians United for Quality.

Winner of the 2012 U.S. Dept. of Labor Office of Apprenticeship 21st Century Trailblazer Award.

UNIVERSITY OF MARYLAND



#1 Best Value in Mid-Atlantic

KIPLINGER'S PERSONAL FINANCE, 2014

Architecture, Planning and Preservation
arch.umd.edu

Civil and Environmental Engineering
civil.umd.edu

Construction Project Management Minor
pm.umd.edu/cpm-minor

Project Management Master of Engineering
pm.umd.edu/meng