

E-guide | U.S. 2019

CAREER PATHWAYS IN ENGINEERING:

Using Your International Education in the U.S.



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INTRODUCTION

Immigrating to the United States is an opportunity to use your international training to either advance in your field or pursue a new career that builds on your education and experience. Because engineering often involves obtaining a license—a process that can be costly and time-consuming—it is especially important to consider your options.

This guide will help you explore career pathways in and related to the field of engineering, as well as alternative careers that use your skills but may not require a license. You will find useful resources to help you plan for your future.

The Pathways Guide at a Glance

If you have completed your education in engineering in another country and are now starting your career in the United States, you will need to understand to what extent you meet the academic requirements of your chosen career.

- The **Gaining Recognition for Your International Education** section (p. 8) will explain how to determine the U.S. equivalency of your international degree to help you explore career pathways in engineering and other fields.
- The **Educational Pathways in the Field of Engineering** section (p. 10) provides examples of careers in the field of engineering that may match your qualifications.
- If you want to continue your career as an engineer in the United States, you may choose to obtain a U.S. license. See the **Licensing and Certification Requirements in Engineering** section (p. 19).
- Not all internationally trained engineering decide to pursue an engineering license in the United States, either because of the time and expense involved, or because they want to pursue a different career. See the **Transferable Skills and Using Them in Related or Alternative Careers** section (p. 21).

Let's get started!

Strategies for Success

Ask Lots of Questions

While you may have a strong idea of what your career will be in the United States based on the professional experience you already have, establishing yourself in a new country is a chance to reach new goals and possibilities. Analyzing your career options in the U.S. can be challenging, but by remaining flexible you can use the education and experience you already have to take steps to succeed.

As you research your options, ask yourself:

- What are my short-term and long-term employment goals?
- What options are available to me based on my skills and qualifications?
- What are the steps and requirements in terms of time, costs, and additional training to pursue my goal?
- Who can I talk to about my options?

Make a Plan

After you have explored some of the career options available to you in the United States, it is time to make decisions and come up with a plan. In the U.S., developing your career path requires a lifelong commitment to learning, networking, and taking risks.

A successful plan includes realistic steps and time frames for completion. Your plan should also make it possible for you to work towards multiple goals at once and allow for some setbacks along the way. It will take patience to reach your goals, and it is normal to change your mind or adapt to new circumstances as you move forward.

Think about the steps it will take to reach your goal. A clear goal-oriented plan may look something like this:

GOAL: Improve my language skills.

STEPS TO GOAL:

- Take an English-language course that suits my needs.
- Meet with an English-language conversation partner weekly.
- Learn terminology and professional language in my field.
- Read the newspaper every day.

You can use the SMART Goal Worksheet (p. 29) to guide you as you outline your plan.

Take Initiative

While your **academic and professional credentials** are very important in your professional success, so are skills like your communication style, English language level, and ability to adapt to U.S. workplace culture. Meeting professionals in the field, joining a professional association, attending conferences, and volunteering are great ways to expand your understanding of the field, improve your skills, and **network** in the U.S.

Finding meaningful work as an immigrant can take time and you may face challenging obstacles. Although many factors are out of your control, try to remain flexible, be persistent, and take initiative. As you explore this guide, you will find a number of helpful resources to support you.

GLOSSARY

Academic and professional credential: The degree, diploma, or license you receive when you complete a program, pass examinations, or meet a set of requirements.

Networking: Interacting with other people to exchange information and develop contacts, especially to further one's career.

YOUR CAREER PATHWAY IN THE UNITED STATES

Like many immigrants, you may initially struggle to gain entry into your professional field in U.S. While you may have adequate knowledge or experience, the challenge often occurs in translating your skills and qualifications in a way that local employers will value and understand. You may also need further education and training, an understanding of your local labor market, and knowledge of how to navigate your options to choose a **career pathway**.



Your career pathway is made up of the educational and professional decisions that will open doors to new opportunities. Education and training are the building blocks of your career—with the skills you acquire, you can earn promotions and take on additional professional responsibilities.

To start thinking about your career options, you will need to understand the difference between regulated and non-regulated professions.

Understanding Regulated Professions

Each state decides which professions it will **regulate** and what level of formal education or training is required for entry into the field. In the United States, specific authorities or licensing bodies are responsible for recognizing professional credentials required for state licensing. Since the time and cost associated with licensing varies by state, contact the relevant licensing body before deciding to proceed with licensing. In this guide, careers usually requiring licensure are clearly marked, but again, this varies from state to state.

Understanding Non-Regulated Professions

Some occupations in the United States are either internally regulated by professional associations, or are entirely non-regulated. In some job titles—such as technician, assistant, or repairer—internationally trained engineers may be able to work without a license. But, although less strict than in regulated professions, certain standards of professional practice or **designations** might still be preferred by employers and professional associations in non-regulated professions. You can demonstrate that

GLOSSARY

Career pathway: A series of connected education and training programs that enable individuals to secure a job or advance in an industry or occupation.

Regulated professions: Professions that require a license or certification.

Designation: A title earned by an individual through a certification process.

you meet these standards through certification processes administered by professional associations. *However, be aware that certain engineering certifications are actually very high-level credentials that require the candidate to already hold licensure at the time of taking the certification exam, so certification is not necessarily an alternative to licensure.*

Can I work as an engineer in the United States without a U.S. license?

The engineering industry in the United States is regulated to protect public safety. That means that working as a **Professional Engineer** (PE) in the U.S. requires either a license. You must be a PE if your work will require you to prepare, sign, seal and submit engineering plans and drawings to any government authority, or to seal engineering work for public or private clients.¹ However, many engineers work in the U.S. without the PE designation if their position does not require it.

The engineering license you may have from your home country is not valid in the U.S. Internationally trained engineers need to meet the same requirements as U.S.-educated engineers.



In this guide, occupations that require a state certification or licensure process are clearly marked.

Many internationally trained professionals decide not to pursue employment in regulated professions due to the challenges of **relicensing**. The field of engineering offers many options for professions that do not require a license or certification to practice.

If you decide against relicensing as an engineer in the United States, you can still work as an engineer with limited privileges or in a field related to engineering in a non-regulated occupation. Some related careers are discussed in the **Transferable Skills and Using Them in Related or Alternative Careers** section of this guide (p. 21).

GLOSSARY

Relicensing: Having to meet licensing requirements in the United States, even if you have a license from another country.

THE ENGINEERING PROFESSION IN THE UNITED STATES

Engineering is a broad profession encompassing a range of more specialized fields, each with a specific emphasis on particular areas of applied science, technology, and types of application. Engineering is a creative as well as a skilled profession, as engineers design and innovate materials, structures, and systems while evaluating practicality, regulation, safety, and cost.

The four most common areas in the field of engineering are civil engineering, mechanical engineering, industrial engineering, and electrical engineering. While all four disciplines fall under the same general heading, they encompass a very wide variety of activities, from the design and building of bridges and airports, to telecommunications, to mechanical product development, to finding ways to accomplish tasks as efficiently as possible. The field of engineering also includes many other areas, each with their own educational and professional pathways.

Working as an Engineer in the United States

In the United States, licensure for engineering and surveying professions is regulated at the state level. A Professional Engineer (PE) or surveyor must be licensed separately in every state in which they practice. Only licensed engineers can call themselves Professional Engineers – and certain tasks, from stamping and sealing designs to bidding for government contracts, are prohibited unless you hold this title.

Note: It is not uncommon to work in the field of engineering in the U.S. without licensure, depending on the type and level of work and whether you work under the supervision of a licensed Professional Engineer (PE).

The process for securing licensure in the U.S. is very different from the professional qualification process abroad, although there may be some similarities, such as specific education and work experience requirements.

- The **National Council of Examiners for Engineering and Surveying** (NCEES) evaluates and oversees credentials as well as developing and administering the PE exam, the results of which it passes on to state licensing boards.
- To learn about the licensure requirements in your state, contact the appropriate licensing board.



HELPFUL TIPS

The PE exam is offered overseas in several countries including Canada, Egypt, Japan, Qatar, Saudi Arabia, South Korea, Taiwan, and Turkey, and United Arab Emirates.

Roles and Responsibilities

Engineering is a diverse field with many possible job titles. Positions tend to fall into general categories such as civil, mechanical, electrical, or industrial engineering. In each of these categories, tasks include design, analysis, testing, production, operations, or sales.

In general, engineers are responsible for:

- Designing tools, processes, products, or equipment in their field.
- Testing production methods and byproducts treatment.
- Performing research and applying principles of their field to solve technical challenges.
- Producing or following specifications for designs and products.
- Overseeing outcomes and resolving problems.

More specifically, engineers in different disciplines can have widely different areas of responsibility. Civil engineers design and construct infrastructure projects, such as bridges, sewer systems, and airports; mechanical engineers research and develop machines, such as medical devices, transportation systems, and heating and cooling systems; electrical engineers design and develop electrical equipment, such as communication and navigation systems; and industrial engineers find ways to make all systems—integrating workers, machines, materials, information, and energy—run as efficiently as possible.²

Understanding Job Titles

The roles and responsibilities of Engineers are highly dependent on areas of expertise and experience. For example, when searching for employment as an engineer, you may see job postings with the following titles:

- Engineer I or II
- Research analyst
- Designer, drafter
- Foreman, consultant
- Engineering associate
- Project or site manager

Continuing education and training can open doors for additional certifications and practicing in different settings. For an internationally trained professional, exploring career pathways begins with an understanding of the value of the education you received in your home country.



You can read more about academic and professional credentials in the Educational Pathways in Engineering section of this guide (p. 10).

GAINING RECOGNITION FOR YOUR INTERNATIONAL EDUCATION

Your education is the foundation of your career. While there may be challenges to using your international credentials in the United States, you do not have to start over. For an internationally trained professional, exploring career pathways begins with an understanding of the value of the education you received in your home country.

Obtaining an **international credential evaluation** is often the first step an immigrant takes to gain access to educational and employment opportunities in the U.S. A credential evaluation helps you gain recognition for your previous studies by considering your country's educational system, the status of the institution you attended, the content of the program, and any entry and graduation requirements.



A credential evaluation compares the education you received in your country to a similar degree or diploma in the United States and provides a **degree equivalency**.



In the United States, employers, licensing boards, and universities use credential evaluations to judge the quality and level of your academic achievements in comparison to those of U.S.-educated candidates.

- Universities, for example, use the information to make admissions decisions and to award transfer credit or advanced standing in a program.
- Employers and licensing boards refer to credential evaluations to evaluate whether or not you meet their academic requirements.

Unlike many other countries, the U.S. does not have a national education ministry to evaluate international degrees. As a result, most academic institutions and state licensing boards—and nearly all employers—rely on credential evaluation services to examine official documents. **In the case of the engineering industry, the preferred credential evaluation service is NCEES Credentials Evaluations, offered by the National Council of Examiners for Engineering and Surveying (NCEES).³ This is the only evaluation service accepted by *all* state licensing boards.**

Before requesting a credential evaluation from any agency, contact the institution that needs

GLOSSARY

International credential evaluation: An expert analysis of an international degree or diploma.

Degree equivalency: The extent to which a degree or diploma earned abroad compares to a similar U.S. credential.

the evaluation to understand their requirements. These institutions are responsible for the final recognition decision.

If you graduated from an engineering program in one of the 19 jurisdictions covered by the Washington Accord (an agreement between engineering organizations to recognize each other's accredited academic qualifications), then your engineering degree may already be declared substantially equivalent to a degree from a U.S. program. However, although the Accreditation Board for Engineering and Technology in the U.S. (ABET) is part of the Washington Accord, it is individual state boards, not ABET, that have the final authority on whether or not a particular degree meets their specific requirements for licensure.⁴

In addition to the U.S., the jurisdictions that have signed to the Washington Accord are:

Canada, China, Chinese Taipei, Hong Kong, India, Ireland, Japan, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Sri Lanka, Turkey, United Kingdom, Pakistan, and Peru.⁵

World Education Services (WES) allows you to preview the U.S. equivalency of your highest completed degree by using a **free equivalency tool**. You may choose to utilize this free service to evaluate whether or not your degree will be found substantially equivalent to a U.S. degree before investing in an official evaluation. It may also be helpful to have an idea of the U.S. equivalency of your international credentials if you are exploring a new career pathway.

Note: This preview does not replace a formal credential evaluation that may be needed for official purposes.

While the NCEES evaluation is required if you are applying for licensure, alternative evaluations may be accepted for other purposes, such as applying to degree programs or for certification exams. You may want to check with your educational institution or credential issuing organization to find out whether a WES evaluation is recognized and accepted. If so, you can apply for a **WES Credential Evaluation.**



Watch the WES Credential Evaluation & Recognition video to learn more about credential evaluation.

Advanced Standing and Transfer Credit

If you are applying to an academic program, you may be eligible for “advanced standing” or “transfer credit” for previous education.

- Advanced standing means you may be allowed to skip pre-requisites for admission into a course, or not repeat a required course, reducing the time to complete a degree.
- Transfer credit means that your previous education is counted toward the total number of credits required for the degree.

For internationally educated individuals, advanced standing and transfer credit is usually determined at the time of application through an international credential evaluation.

EDUCATIONAL PATHWAYS IN THE FIELD OF ENGINEERING

Once you know the value of your international degree, you can use the information in this section to move forward in your career.

The field of engineering is a growing and rewarding field that offers many exciting career options. In this section you will find some examples of engineering careers, including their key roles and where further education may be helpful. You will also find information on how to meet the academic requirements for some popular engineering careers.



HELPFUL TIPS

Research shows that immigrants who add a U.S. degree or certification to their international education and training are more likely to progress faster in their careers.



A career pathway is a series of connected education and training programs that build on each other to enable you to advance in an industry or occupation.

ASSOCIATE
DEGREE

BACHELOR'S
DEGREE

MASTER'S
DEGREE

DOCTORATE
DEGREE

ASSOCIATE DEGREE



Working in the field of engineering with an associate degree typically involves working in a technician role in one of the main areas of engineering. These include:

Civil Engineering Technician

- Help civil engineers to design and construct infrastructure projects, such as bridges, sewer systems, and airports.
- May also help to design and construct industrial, commercial, or residential building projects.

Mechanical Engineering Technician

- Help mechanical engineers research and develop machines, such as medical devices, transportation systems, and heating and cooling systems.
- Duties may also include record keeping and data analysis, sketching rough layouts, and doing calculations for the supervising engineer.

Electrical and Electronics Engineering Technician

- Help electrical engineers design and develop electrical equipment, such as communication and navigation systems.
- May work in product assessment and testing, using diagnostic equipment to evaluate, fine-tune, and repair products.

Industrial Engineering Technician

- Help industrial engineers find ways to make systems run as efficiently as possible, integrating workers, machines, materials, information, and energy.
- May design machinery and equipment layouts and plan workflows for maximum efficiency, as well as analyzing production statistics and costs.



While certification is not required, engineering technicians can make themselves more attractive candidates for employment by pursuing certification from The National Institute for Certification in Engineering Technologies (NICET), a division of the NSPE. The technician **certification programs** include nine specialties within the fields of civil, electrical, and mechanical engineering technology.

Drafters/Drafting Engineer

- Prepare detailed technical drawings and plans for engineering projects under the direction of an engineer, using computer-aided design (CAD) software.
- Computer-Aided Design (CAD) degree preferred.



Although you can find work in the field of engineering with just an associate degree, a bachelor's degree may increase your chances of finding employment.

BACHELOR DEGREE

A bachelor's degree in engineering is the minimum degree required to qualify for most entry-level jobs as an engineer. Entry-level positions may also require knowledge of a specialized field or geographic area served, internship experience, and proficiency with specialized software.

Civil Engineer

- Design and construct infrastructure projects, such as roads, bridges, water supply systems, sewer systems, and airports.
- Sample Job Titles: Civil Engineer I, Project Engineer, Structural Engineering Designer, Associate Traffic Engineer, Civil Engineering Designer.
- The American Society of Civil Engineers also endorses the **Envision Sustainability Professional (ENV SP)** certification, offered by the Institute for Sustainable Infrastructure, as well as the **professional designations** offered by the American Council of Engineering Companies. These include Expert Witness (EXW), Management Engineer (MgtEng), and Executive Engineer (ExecEng). Requirements for all three credentials include a PE license and between 7-20 years of related work experience, depending on the credential.

Case Study: Priya



Priya Kapoor is a 26-year-old engineer from India. She has an undergraduate degree in civil engineering from the Indian Institute of Technology Bombay, and worked for three years as a civil engineer in Mumbai before immigrating to the U.S., where she settled with extended family in New Jersey. Priya spent about six months attending networking events like happy hours and lectures through a variety of professional associations: the American Society of Civil Engineers, the Society of Asian Scientists and Engineers, and the Society of Women Engineers. Attending these events allowed her to make connections and build relationships in her field, which eventually led to a new job as a project engineer for a small firm. She is now planning to take the PE exam once she has met the requirement of four years' work in her field, and is also applying to master's programs within commuting distance—both in New Jersey and in New York—with the goal of earning a degree with a specialty in sustainable infrastructure.

Mechanical Engineer

- Research and develop machines, such as medical devices, transportation systems, electric generators and turbines, automated factory equipment, and heating and cooling systems.
- Sample Job Titles: Mechanical Engineer, Project Engineer, Quality Engineer, Reliability Engineer, Software Engineer.
- Although certification is not required, mechanical engineers can make themselves more attractive candidates for employment by pursuing a number of vendor-specific certifications in programs that are commonly used in the industry. Among the most useful are CATIA and Solidworks, offered by **Dassault Systemes**, as well as **CREO** from PTC.
- Mechanical engineers may also want to pursue the **Certified Reliability Engineer (CRE)** credential, offered by the American Society for Quality.

Electrical or Electronics Engineer

- Design and develop electrical equipment, such as communication and navigation systems, and the electrical systems within machines such as cars and aircraft.
- Manufacturing industries that employ electrical engineers include automotive, marine, railroad, aerospace, defense, consumer electronics, commercial construction, lighting, computers and components, telecommunications and traffic control.⁶
- Sample Job Titles: Electrical Engineer, Engineering Associate, Network Implementation Engineer, Optical Engineer, Embedded Software Engineer, Design Engineer, Cyber Security Engineer, Junior Lighting Designer, Systems and Equipment Engineer, Maintenance Engineer.
- Although certification is not required, electrical engineers can make themselves more attractive candidates for employment by pursuing **Certified Energy Manager (CEM)** certification. There is a combined education and work experience requirement: higher-level degrees can be combined with less work experience, while you can also take the CEM exam with no degree but at least ten years of related work experience. Once you have achieved CEM certification, you can go further and pursue a **Certified Green Building Engineer** credential, if you also hold a PE license. Both credentials are offered by the Association of Energy Engineers.

Industrial Engineer

- Find ways to make systems run as efficiently as possible, integrating workers, machines, materials, information, and energy.
- Although an engineering degree is required, it does not necessarily have to be in industrial engineering. Many industrial engineers have degrees in mechanical engineering, electrical engineering, manufacturing engineering, industrial engineering technology, or general engineering.
- Sample Job Titles: Continuous Improvement Engineer, Business Intelligence Consultant, Associate Distribution Engineer, Association Logistics Engineer, Quality Engineer, Inventory and Asset Control Manager, Associate Operations Research Engineer.
- Although certification is not required, industrial engineers can make themselves more attractive candidates for employment by pursuing Lean Certification, offered in partnership by the Society of Manufacturing Engineers (SME), the Association for Manufacturing

Excellence (AME), and the Shingo Institute. **Lean Certification** is offered at the Bronze, Silver, and Gold levels, with Silver and Gold levels require a minimum of two and five years of work experience, respectively.

Civil engineers are projected to represent the greatest number of new jobs among engineering occupations, because they will be needed to improve and maintain aging infrastructure in the U.S. Mechanical, electrical, and industrial engineering are also all expected to experience significant employment growth in the coming years.⁷ Additional high-demand areas for engineers include: Biomedical, Petroleum, Environmental, Nuclear, and Computer Hardware.



You can upgrade your education and skills to qualify for more jobs in the field of engineering by earning a master's degree. With a master's degree in engineering, you can pursue specialized jobs in different engineering fields, with opportunities to become a lead engineer and to work on more specialized projects. In some cases, you may alternatively advance your career by pursuing certifications that demonstrate a high level of expertise in a specific field. Although most certifications require only a bachelor's degree, many also require licensure and between 5-20 years of related work experience, and so are considered advanced credentials.



Although a degree in engineering is required for almost all entry-level engineering jobs, you might qualify for some engineering jobs with a science-related major. Consider these other career options:

Surveyor

Make precise measurements to determine property boundaries. *All states require surveyors to be licensed before they can certify legal documents and provide surveying services to the public.*

Computer and Information Systems Manager

Plan, coordinate, research and facilitate the computer-related activities of organizations.

MASTER'S DEGREE

A master's degree may not be necessary to obtain an engineering position, but many mid- or senior-level positions at the management level in engineering call for an advanced degree. Engineers with master's degrees tend to have higher starting salaries and more easily secure leadership positions.⁸ Some experts say that in a popular field like mechanical engineering, a job candidate with a master's degree will have an advantage over other applicants.

Master's degrees in engineering can be a good option for recent graduates who want to specialize within engineering or switch their focus. Some engineers choose to pursue a Master of Business Administration rather than a Master of Science.⁹ Others feel that on-the-job experience, or participation in continuing education while working as an engineer, are excellent ways to advance in the field.

Online programs may be directed toward working professionals and offer a non-thesis track or the opportunity to complete a master's degree while employed. A master's degree with a research track is directed at those students interested in continuing on to a doctoral degree.

Here are some positions requiring a master's degree:

Civil Engineering

- The Master of Science in Civil Engineering (MSCE) may include other specialties such as Environmental or Structural Engineering. Subspecialty areas include: Sustainable Infrastructure, Geotechnical Engineering, Hydrology and Hydrodynamics, or Transportation Engineering.
- **Sample Job Titles:** Construction Engineer, Structural Engineer, Building Control Surveyor, Water Resource Engineer, Building Services Engineer, Engineering Geologist, Quantity Surveyor.
- Although certification is not required, civil engineers can make themselves more attractive candidates for employment by pursuing **Board Certifications** from The American Society of Civil Engineers, in specialty areas including Coastal, Geotechnical, Navigation, Ocean, Ports, and Water Resources Engineering. Minimum requirements include a PE license or international equivalent, Master's degree, and eight years post-licensure progressive engineering experience.¹⁰
- The American Society of Civil Engineers also endorses the **Envision Sustainability Professional (ENV SP)** certification, offered by the Institute for Sustainable Infrastructure, as well as the **professional designations** offered by the American Council of Engineering Companies. These include Expert Witness (EXW), Management Engineer (MgtEng), and Executive Engineer (ExecEng). Requirements for all three credentials include a PE license and between 7-20 years of related work experience, depending on the credential.

Mechanical Engineering

- The Master of Science in Mechanical Engineering (MSME) may include other specialties such as Mechatronics, Aerospace Engineering, or Mechanical Engineering Modelling.
- **Sample Job Titles:** Senior Mechanical Engineer, Senior Mechanical Systems Engineer, Senior Mechanical Design Engineer, Senior Mechanical Project Engineer.

- Although certification is not required, mechanical engineers can make themselves more attractive candidates for employment by pursuing a number of vendor-specific certifications in programs that are commonly used in the industry. Among the most useful are CATIA and Solidworks, offered by **Dassault Systemes**, as well as **CREO** from PTC.
- Mechanical engineers may also want to pursue the **Certified Reliability Engineer (CRE)** credential, offered by the American Society for Quality.

Electrical Engineering

- Specialty areas for the Master of Science in Electrical Engineering (MSEE) might include: Signal Processing and Communications, Systems and Control, Electromagnetics and Photonics, or Bioelectrical.¹¹
- **Sample Job Titles:** Senior Electrical Engineer, Senior Electrical Design Engineer, Senior Project Engineer.
- Although certification is not required, electrical engineers can make themselves more attractive candidates for employment by pursuing **Certified Energy Manager (CEM)** certification. There is a combined education and work experience requirement: higher-level degrees can be combined with less work experience, while you can also take the CEM exam with no degree but at least ten years of related work experience. Once you have achieved CEM certification, you can go further and pursue a **Certified Green Building Engineer** credential, if you also hold a PE license. Both credentials are offered by the Association of Energy Engineers.

Industrial Engineering

- The Master of Science in Industrial Engineering (MSIE) might include course study in Human Factors Engineering, Manufacturing Systems Engineering, Operational Research, or Production Systems Engineering.¹²
- **Sample Job Titles:** Senior Quality Engineer, Senior Solutions Architect, Senior Logistics Engineer, Senior Automation Engineer, Senior Process Engineer.
- Although certification is not required, industrial engineers can make themselves more attractive candidates for employment by pursuing **Lean Certification**, offered in partnership by the Society of Manufacturing Engineers (SME), the Association for Manufacturing Excellence (AME), and the Shingo Institute. Lean Certification is offered at the Bronze, Silver, and Gold levels. None of them have any stated educational requirements; and although Bronze level does not have any work experience requirements either, Silver and Gold levels require a minimum of two and five years of work experience, respectively.



Upgrade your education and skills to qualify for more jobs in the field of engineering by earning an advanced degree. If your interests lie in research, consider a doctoral degree. A PhD in engineering will enable you to work in research labs and academia.

DOCTORAL DEGREE

DOCTOR OF PHILOSOPHY (PHD)

A doctorate in engineering involves several years of study and requires a love of research. A PhD is for those who want to work in research either in industry or in academia or for a government research lab. Engineering PhDs provide even more specialization than master's degrees, and a higher earning potential, but research jobs are very competitive, and tenure-track faculty positions can be difficult to obtain. Below are two areas of engineering in with job opportunities for PhDs.

Chemical Engineer

- Design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations.
- Preparation for management positions usually requires working under the guidance of a more experienced chemical engineer.
- Sample Job Titles: Bioprocess Development, Chemist Analyst, Process/Product Developer.

Biomedical Engineer

- Biomedical engineers combine engineering principles with medical sciences to design and create equipment, devices, computer systems, and software used in healthcare.
- To lead a research team, a biomedical engineer generally needs a graduate degree.
- Sample Job Titles: Senior Imaging System Engineer, Senior Principal Engineer, Senior Project Engineer Research and Development.

Academic Requirements in Engineering

Consider these educational requirements for careers in the field of architecture, from entry-level to advanced professions.

✓ Requirements for Engineering Technicians

- ✓ Most employers prefer to hire technicians with a two-year associate degree or other postsecondary training in engineering technology.
- ✓ Graduates of two-year engineering technology programs are generally called technicians, while graduates of four-year engineering technology programs are generally called technologists.
- ✓ **Engineering Technology programs** for technicians can be found in technical or community colleges. Associate degree programs generally last two years. If you already have prior training in a related field, you may want to consider certificate programs that can be completed in a year or less.



Requirements for Engineer

- ✓ Requires a bachelor's degree in engineering.
-
- ✓ A degree from a program accredited by **ABET** is needed to earn the Professional Engineer (PE) license. In many states, a bachelor's degree in engineering also meets the academic requirement for obtaining a license.¹³
-



Requirements for Engineer Manager

- ✓ Requires a bachelor's degree in engineering.
-
- ✓ A bachelor's degree in engineering from a program accredited by **ABET** is needed to earn the Professional Engineer (PE) license.¹⁴
-
- ✓ Further education after the bachelor's degree, along with the PE license and previous experience, is helpful in getting a job as a manager.
-
- ✓ If you do not have a PE license but do have seven to ten years of related work experience, you can still find work as an engineering program manager. The American Council of Engineering Companies offers a **Management Professional (MgtPro)** certification for non-licensed professionals who manage programs in the engineering field. Pursuing this certification may make you a more attractive candidate for employment in engineering program management.
-

LICENSING AND CERTIFICATION REQUIREMENTS IN ENGINEERING

This section of the guide provides general information on licensing and certification, and helpful resources to guide you as you move forward.

Licensure for Engineers

The licensing process for engineers is complex and can take many years. Although engineers can work in professional positions without a license, a Professional Engineer (PE) license offers many professional advantages. Although requirements vary by state, a PE license typically requires:

- A bachelor's or master's degree in engineering from a program accredited by the Engineering Accreditation Commission (EAC) of **ABET**.



Because international licensure candidates often have degrees from programs that are not accredited by EAC/ABET, most U.S. licensing boards require candidates to have their academic credentials evaluated.

NCEES offers a **Credentials Evaluations service** that compares a candidate's academic background to established criteria and provides this information to the U.S. licensing board where the candidate is applying to sit for an exam.

- Passing the **Fundamentals of Engineering (FE) exam**, to be taken upon or just before graduating with an undergraduate engineering degree.
- Four years of acceptable work experience in the candidate's engineering discipline.
- Achieving an acceptable result on the Principles and Practice of Engineering (PE) exam in the candidate's discipline.

The FE and PE exams are written and graded by the **National Council of Examiners for Engineering and Surveying (NCEES)**. However, each state's licensing board sets its own education and experience requirements that must also be met in order for them to confer a PE license. Contact the **state licensing board** in the U.S. state or territory where you plan to apply for licensure to find out its specific requirements.

If you do decide to pursue licensure, it can be helpful to find related work in the engineering field while you are preparing for the exam, as it may be able to count towards your work experience requirement. See the **Related Careers** section (p.22) for more information on engineering careers that do not require a PE license.

Certification for Engineers

Certifications are voluntary credentials that you can earn to prove your proficiency in a given field, and they may help you secure employment or a higher salary. The requirements for engineering certifications vary: some are entry level, and some demonstrate the highest level of expertise, and require licensure and many years of work experience in order to even take the certification exam. Some of the engineering certifications most requested by employers are:

- **Lean Certification**, offered by the Society of Manufacturing Engineers
- **Certified Energy Manager and Certified Green Building Engineer**, offered by the Association of Energy Engineers
- The **specialty area Board Certifications and the Envision Sustainability Professional Certification**, offered by the American Society of Civil Engineers

The information presented in this guide should not be considered exhaustive. It is always important to consult state licensing boards and professional associations for the timeliest and most authoritative guidance. See the **Additional Resources in the Field of Engineering** section of this guide (p. 25) for a list of helpful resources.

TRANSFERABLE SKILLS AND USING THEM IN RELATED OR ALTERNATIVE CAREERS

Transferable Skills

Many immigrants find that they may not be qualified for the same job they had in their home country because job titles and requirements in their field are different in the United States. Whether because of a lengthy licensing process or a need for immediate employment, they may pursue other options that use their training and experience.

The key to finding alternative paths to a fulfilling career is to identify your skills (what you know how to do), knowledge (what you know), competencies (what you are good at), and aptitudes (what is easy for you to learn) that can be useful in a related or alternative career. These **transferable skills** are essential for career success and will enable you to adapt to changing circumstances, especially when your education and experience are from another country.

As you identify your transferable skills, it can be helpful to think about the difference between *hard skills* and *soft skills*. Employers place great value on *soft skills*, such as your ability to communicate, lead others, organize projects, and work effectively on a team—skills you probably already use on a daily basis. You can also apply your more technical *hard skills*, such as computer skills, foreign language fluency, and understanding specialized vocabulary, to a completely different career.

Soft skills in particular depend on your ease and ability to communicate in English, which can be a challenge when it is not your first language. In order for your soft skills to benefit you in a U.S. job search, you must practice both your written and spoken English, and familiarize yourself with English terminology that is specific to your field. You may want to consider taking a course that will teach you the vocabulary specific to working in your industry. Some offerings for learning English for engineering are:

- **English for Science, Technology, Engineering, and Mathematics**, a course created by the University of Pennsylvania and funded by the U.S. Department of State Bureau of Educational and Cultural Affairs, Office of English Language Programs, and offered online by Coursera.
- A three-course “specialization” in **Communication Skills for Engineers**, created by Rice University and offered online by Coursera. (Note: these classes were designed for native English speakers, but could be helpful practice if you already have advanced English skills.)
- **English Communication Skills for Engineers**, offered online by Udemy.

GLOSSARY

Transferable skills: skills developed in one situation or occupation which can be transferred to another context.

Are you including your transferable skills on your résumé? **Engineers typically have the following skills and expertise that could be applied to a different career:**

- Project planning
- Communication and teamwork
- Higher mathematics
- Computer skills and IT knowledge
- Problem solving
- Creative thinking
- Ability to plan, organize, and prioritize tasks

Related and Alternative Careers in Engineering

Why consider a different career?

- Open doors to new career possibilities.
- Provide income while you work toward your license.
- Grow your **professional network** in the United States.
- Help you gain American work experience.

If you have spent many years committed to a profession, it is understandable to feel that your career—just like your relationships, hobbies, and beliefs—is a key part of your identity. It is not unusual to experience a sense of identity loss or failure at having to explore a new career path.⁵¹ In the United States, however, going “back to school” to switch careers is quite common.

Some of the careers described in this section require additional education or training. It is possible to find options that take only a few months, as well as more in-depth options that can take a year or more.

Examples of Related Careers

Many careers in the field of engineering do not require you to be licensed as an engineer (although may require additional certification specific to the career). These are ideal options for internationally trained engineers who want to continue working in the field of engineering but do not want to undergo the relicensing process, or who want to work while relicensing in the United States. Search different engineering technology careers and other engineering careers at **BLS Occupational Outlook** and **Education-Portal**.

GLOSSARY

Professional network: Relationships and acquaintances that you stay in contact with based on professional rather than personal connections.

- **Engineering Technologist**
 - Specialize in implementing existing engineering technology.
 - Work as part of a team with engineers on a variety of projects.
 - Work focuses on activities related to product improvement, manufacturing, and construction.
 - Certification is voluntary, but may make you a more attractive candidate for employment. Technologist certification from the National Institute for Certification in Engineering Technologies (NICET) requires a four year bachelor's degree in engineering technology from an ABET accredited program. If you hold a technologist certification from a member of the Canadian Council of Technicians and Technologists, then you can apply for U.S. technologist certification through Canadian Reciprocity.¹⁵
- **Construction and Building Inspectors** often work on work-sites, ensuring that local and national building codes and ordinances, zoning regulations, and contract specifications are up to standard. Requires at least a high school diploma.
- **Industrial Machinery Mechanics and Maintenance Workers and Millwrights** specialize in repairing and maintaining machinery at all levels of construction. Requires at least a high school diploma.
- **Electro-mechanical Technicians** work specifically with electro-mechanical, unmanned machines. Requires at least an associate degree.
- **Construction managers** oversee a team of workers on a project and are responsible for scheduling, coordinating and hiring construction site contractors. Requires at least a bachelor's degree.
- **Cost Estimators** use their skills in mathematics to estimate financial, labor, and material expenses for projects. Requires at least a bachelor's degree.
- **Cartographers and Photogrammetrists** create and update maps and charts. Requires at least a bachelor's degree.
- **Sales engineers** are technical resources who articulate how business and technical employees can better utilize technology and equipment. Typical requirements include communication skills, a degree in engineering, and some sales experience. Requires at least a bachelor's degree.

Examples of Alternative Careers

Alternative careers are occupations outside of the field of engineering in which you can use the skills and knowledge you gained during your education and training as an engineer. Consider these types of careers if you are interested in exploring a different career path.

Career or Technical Education Teacher

- Instruct students in technical and vocational subjects at the secondary or postsecondary levels in secondary or postsecondary schools such as two-year colleges, or technical, trade, and business schools.

- Requires the ability to communicate knowledge to others clearly using tutorials, lectures, and hands-on work.
- Usually requires a post-secondary degree and work experience in the subject you are teaching.
- To teach in public schools, you must meet additional requirements, including:
 - Completing a supervised period of student teaching.
 - Passing a background check.
 - Obtaining teaching certification and/or licensure. Specific requirements vary by state. You can explore the [WES Career Pathways in the Field of Education Guide](#) for more information.

Case Study: Zhang



Zhang Jie is a 45-year-old engineer from China. He holds a degree in electrical engineering from Tsinghua University in Beijing, and worked as an electrical engineer in China for 12 years. He and his family sought asylum in the U.S. ten years ago, but his limited English presented a major obstacle when he tried to find work in the U.S.—and settling in a largely Chinese neighborhood of New York City meant that he did not get much opportunity to practice English on a daily basis. Jie found evening work in a restaurant, and decided to start volunteering in his daughter’s school during the day, where he realized that he loved teaching—a career path that had never been presented to him as a viable option during his upbringing in China. He decided to change careers and become a technical teacher, so that he could utilize his scientific skills and bring his love of science to his students. He started by teaching at the local community college, as it did not require a teaching degree; he is now also pursuing a teaching degree at the same college where he works, so that he can eventually teach in public middle and high schools as well.

Technical Sales Representative or Sales Engineer

- Sell scientific and technological products or services to businesses.
- Requires extensive knowledge of the products’ parts and functions and an understanding of the scientific processes that make these products work.
- Usually requires a post-secondary degree and strong communication skills.

Computer Support Specialist

- Provide help and advice to computer users and organizations. These specialists either support computer networks or provide technical assistance to computer users.
- Education and training requirements vary, but employment of computer specialists is expected to grow faster than average.

Technical Trainer

- Plan, conduct, and administer programs to train employees and improve their skills and knowledge.
- Responsibilities may include analyzing the training needs of an organization, and then developing technical training courses and materials suitable for staff, from those with the most basic technical or IT knowledge, to those with high-level technical skills and engineering backgrounds.
- Usually requires a bachelor's degree, work experience, and strong communication skills.

ADDITIONAL RESOURCES IN THE FIELD OF ENGINEERING

You can explore the following helpful resources for more information on education, employment, licensing, and financial assistance to pursue a career in the field of engineering.

Educational Resources

- **List of Accredited Programs** includes college and university programs in engineering and engineering technology accredited by the **Accreditation Board for Engineering and Technology**.
- **Mutual Recognition Agreements (MRAs)** recognize the substantial equivalency of certain international accreditation systems with respect to the preparation of graduates to begin professional practice at the entry level. Signatories agree to recommend that graduates from recognized programs be afforded the same rights and privileges as those graduates in the home country. These agreements are non-binding for colleges, universities, employers, and licensing agencies.
- **The National GEM Consortium** aims to increase the participation of underrepresented groups (African Americans, American Indians, and Hispanic Americans) at the master's and doctoral levels in engineering and science.
- There are a number of programs nationwide to assist engineers in their job search. You can look up programs by keyword on the **IMPRINT Program Map**. Featured on the map in New York, for example, the **Cooper Union Retraining Program for Immigrant Engineers**, assists immigrant engineers who are underemployed or unemployed gain access to higher paying jobs through training and job placement assistance.

Career/Employment Resources

- **NSPE Career Center** includes a job search engine and other employment resources.
- **The Engineering Job** is a job search website for engineering professions.
- **National Institute for Certification in Engineering Technologies Career Center** is a job search engine for engineering technicians.
- **MentorNet** is a free online mentoring service for engineering and science professionals
- **National Action Council for Minorities in Engineering (NACME)** aims to increase the proportion of African American, American Indian, and Latino graduates in STEM education and careers.
- **National Society of Black Engineers (NSBE)** is a group of student-governed organizations in the country to increase the number of culturally responsible black engineers.

- **Society of Mexican American Engineers and Scientists** aims to increase the number of Mexican Americans and other Hispanics in the technical and scientific fields.
- **Society of Hispanic Professional Engineers** offers independent network of Hispanic professional and student chapters throughout the U.S.
- **Society of Asian Scientists and Engineers** is dedicated to the advancement of Asian heritage scientists and engineers in education and employment.

Licensing and Certification Resources

- **U.S. Licensing for Internationally Educated Engineers** contains information and links for engineers who were educated or who practice in other countries and are seeking licensure in the United States.
- The National Society of Professional Engineers (**NSPE**) provides information and resources on **PE Licensure** and **How to Get Licensed**, as well as links for NSPE-endorsed **preparation courses** for the FE and PE examinations.
- **List of State Licensing Boards** provides the contact information of state boards along with exam requirements and other information.
- **Demonstrating Qualifying Engineering Experience For Licensure** explores what constitutes acceptable qualifying engineering experience for the purposes of licensure
- **NCEES Records** is for licensed engineers and surveyors who plan to practice in multiple states. Before you can apply for an NCEES record, you must first be licensed by a licensing board in the United States.
- **NCEES Credential Evaluations** is a service for state licensing boards and applicants. It is designed for candidates who have earned their degrees outside the United States and are pursuing licensure through one of the member licensing boards of NCEES. Contact your state board before you begin the process.
- The UK based Institution of Civil Engineers has a **guide to working in the U.S.** for UK trained engineers, which includes information on pursuing licensure.
- For information on the licensing process in California, Illinois, Michigan, New Hampshire, and New York, as well as additional job alternatives in engineering, see **Upwardly Global's guide for internationally trained engineers**.
- Industrial engineers can pursue **Lean Certification**, offered in partnership by the Society of Manufacturing Engineers (SME), the Association for Manufacturing Excellence (AME), and the Shingo Institute. Lean Certification is offered at the Bronze, Silver, and Gold levels. None of them have any stated educational requirements; and while Bronze level does not have any work experience requirements either, Silver and Gold levels require a minimum of two and five years of work experience, respectively.
- Electrical engineers can pursue **Certified Energy Manager (CEM)** certification. There is a combined education and work experience requirement: higher-level degrees can be combined with less work experience, while you can also take the CEM exam with no degree but at least ten years of related work experience. Once you have achieved CEM certification,

- you can go further and pursue a **Certified Green Building Engineer** credential, if you also hold a PE license. Both credentials are offered by the Association of Energy Engineers.
- The American Society of Civil Engineers offers **Board Certifications** in specialty areas including Coastal, Geotechnical, Navigation, Ocean, Ports, and Water Resources Engineering. Minimum requirements include a PE license or international equivalent, Master's degree, and eight years post-licensure progressive engineering experience.
- The American Society of Civil Engineers also endorses the **Envision Sustainability Professional (ENV SP)** certification, offered by the Institute for Sustainable Infrastructure, as well as the **professional designations** offered by the American Council of Engineering Companies. These include Expert Witness (EXW), Management Engineer (MgtEng), and Executive Engineer (ExecEng). Requirements for all three credentials include a PE license and between 7-20 years of related work experience, depending on the credential.
- The American Council of Engineering Companies also offers a **Management Professional (MgtPro)** certification for non-licensed professionals who manage programs in the engineering field. Requirements include 7-10 years of related work experience.
- Mechanical engineers can pursue a number of vendor-specific certifications in programs that are commonly used in the industry. Among the most useful are CATIA and Solidworks, offered by **Dassault Systemes**, as well as **CREO** from PTC.
- Mechanical engineers may also want to pursue the **Certified Reliability Engineer (CRE)** credential, offered by the American Society for Quality.
- The National Institute for Certification in Engineering Technologies (NICET), a division of the NSPE, offers certifications for engineering technicians and technologists. The **technician certification programs** include nine specialties within the fields of civil, electrical, and mechanical engineering technology. The technologist certification program offers two levels of certification, and requires a Bachelor's degree from an accredited engineering technology program. The Associate Engineering Technologist credential may be earned upon graduation, while the Certified Engineering Technologist credential requires at least five years of related work experience in addition to the degree. If you hold a technologist certification from a member of the Canadian Council of Technicians and Technologists, then it is also recognized by NICET, and you can apply for U.S. technologist certification through **Canadian Reciprocity**.

SMART GOAL WORKSHEET

Now that you have reviewed this guide, the next step is to think about your career plan. We recommend using Specific, Measurable, Achievable, Relevant, and Time-based (SMART) goals. You can use this SMART goal template to help you identify your next steps.

GOAL	SPECIFIC	MEASURABLE	ACHIEVABLE	RELEVANT	TIME-BASED
What do you want to achieve?	Who? What? Why? Where? When?	How much? How often? How many?	Can it be done?	Is it relevant to your ultimate vision?	When?

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WES Global Talent Bridge is a program dedicated to helping skilled immigrants fully utilize their talents and education in the United States. Global Talent Bridge joins with institutional partners and community organizations to help skilled immigrants leverage their training, achieve their professional goals, and contribute their talents to their full potential.

Global Talent Bridge provides technical assistance, staff training and specialized resources to community organizations, adult education programs, government agencies and academic institutions so they can better support, advise and integrate highly-qualified immigrants. It also conducts research and policy advocacy efforts to advance opportunities for skilled immigrants at the local, state and national level.

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