**What is Engineering? A Brief Overview**

From GPS to wastewater management, we have a lot to thank engineers for.

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**Engineering: The Definition**

In the simplest terms, engineering is the act of using the scientific method to solve real-world problems, build practical machines and tools, and make the world a better place. Indeed, we owe pretty much all of our infrastructures to the work of engineers throughout the centuries. From the ancient Greek mathematical genius Archimedes, to artists-engineers like [Leonardo Da Vinci](https://interestingengineering.com/video/the-genius-of-leonardo-da-vinci) and visionary [Nikola Tesla](https://interestingengineering.com/the-life-and-times-of-nikola-tesla) (I suppose we must also mention [Elon Musk](https://interestingengineering.com/elon-musk-innovator-and-engineer)), engineers help shape the world as we know it in a variety of ways. There are many various types and subtypes of engineering, but here are the most basic types summarized.

**Mechanical Engineering:**

Engineers in this field are definitely the kind of people who like taking things apart, learning how they work, putting them back together, and troubleshooting any problems that may arise. As such, they enjoy designing and building machines that function for specific purposes.

**Civil Engineering:**

Since the beginning of history, humans have engaged in civil engineering (it's believed to be the oldest type of engineering). Simply put, civil engineering is the act of developing and maintaining buildings, roads, bridges, and dams. You know your fancy toilet? Yeah-those are pretty new in the grand scheme of things. Well, they wouldn't exist without civil engineers who designed not only sewage systems, but water filtration systems.

**Structural Engineering:**

Structural engineering and civil engineering sort of go [hand-in-hand](https://www.seaoc.org/page/whatisase). Structural engineers look at things civil engineers create, and see whether their designs and concepts are practical, and can be built safely. They also oversee the construction itself to make sure things like bridges, power plants, skyscrapers, large buildings, dams, and even homes are structurally sound.

**Chemical Engineering:**

Chemical engineers apply the principles of chemistry, biology, physics, and math to solve problems that involve the production or use of chemicals, fuel, drugs, food, and many other products. They design processes and equipment for large-scale manufacturing, plan and test production methods and byproducts treatment, and direct facility operations.

**Petroleum Engineering:**

Petroleum engineering, as you might be able to guess, involves the design and development of methods for extracting oil and gas from deposits below the Earth’s surface. Petroleum engineers also find new ways to extract oil and gas from older wells. You might imagine this industry is going by the wayside, given the push toward sustainable and clean forms of energy, but petroleum products are likely to be with us for a quite a while still.

**Electrical Engineering:**

Electricity powers our phones, TVs, homes, offices, and it pretty much makes the modern world go 'round. Without it, the world would revert back to the dark ages. Electrical engineers design, develop, test, and supervise the manufacture of electrical equipment, such as electric motors, radar and navigation systems, communications systems, or power generation equipment. Electrical engineers also design the electrical systems of automobiles and aircraft.

They are also responsible for designing and developing electronic equipment, including broadcast and communications systems, such as portable music players and Global Positioning System (GPS) devices. Many also work in areas closely related to computer hardware.

**Industrial Engineering:**

[Industrial engineering](https://www.bls.gov/ooh/architecture-and-engineering/industrial-engineers.htm) is all about optimization: Can we design something that is more cost-efficient, takes less time to build with less resources, manpower, and energy, but still up to the standards of quality something that cost more would be? They also solve technical problems with phones, planes, cars, computers, and other things we deal with in our daily life.

**Aerospace Engineering:**

Aerospace engineering, otherwise known as aeronautical engineering or astronautical engineering—is probably one of the most exciting branches of engineering, being that it is involved in designing and building devices that could allow humans to leave the planet and go in search of another home. Aerospace engineers are also responsible for helping design aircraft, missiles, spacecraft, and national defense systems. Additionally, aeronautical engineers—people who work with airplanes and other propulsion systems—are an important part of the field.

**Biomedical Engineering:**

Biomedical engineering is an exciting field that [combines engineering with biology](https://www.mendeley.com/careers/news/careers-jobs-field/biomedical-engineering-what-it-and-what-are-career-opportunities)—combining engineering principles with medical and biological sciences to design and create equipment, devices, computer systems, and software used in healthcare. For example, we can thank biomedical engineering for so many breakthroughs: artificial organs, kidney dialysis, robotic instruments for non-intrusive surgeries, artificial limb replacements, pacemakers, dentures, and so much more.

**Environmental Engineering:**

This subset of engineering focuses on ways in which we can protect the Earth and Earth's biodiversity from pollution, and overall improve the health and extend the longevity of both the environment and all living things on the planet.

There's some overlap with civil engineering here, as [environmental engineers](https://www.britannica.com/technology/environmental-engineering) also help build sewage systems, focus on water filtration systems, irrigation, and other forms of improving the things we take for granted—like clean water and indoor plumbing. Environmental engineers use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems. They work to improve recycling, waste disposal, public health, and water and air pollution control. They also address global issues, such as unsafe drinking water, climate change, and environmental sustainability.

**Nuclear Engineering:**

Nuclear engineers research and develop the processes, instruments, and systems used to derive benefits from nuclear energy and radiation. Many of these engineers find industrial and medical uses for radioactive materials—for example, in equipment used in medical diagnosis and treatment. Many others specialize in the development of nuclear power sources for ships or spacecraft.