# Engineers

# Engineer

**Job Outlook:**
About as fast as the average

**Annual salary :**
$81,660 to $87,610

**Hourly rate:**
$40.68

**Length of training:**
Four to six eight years

Engineers apply the principles of science and mathematics to develop economical solutions to technical problems. Their work is the link between scientific discoveries and the commercial applications that meet societal and consumer needs. For example, in developing an industrial robot, engineers precisely specify the functional requirements; design and test the robot's components; integrate the components to produce the final design; and evaluate the design's overall effectiveness, cost, reliability, and safety. This process applies to the development of many different products, such as chemicals, computers, power plants, helicopters, and toys.

## AREAS OF SPECIALIZATION

- *Aerospace engineers*
- *Agricultural engineers*
- *Biomedical engineers*
- *Chemical engineers*
- *Civil engineers*
- *Computer hardware engineers*
- *Electrical engineers*
- *Electronics engineers*
- *Environmental engineers*
- *Health and safety engineers*
- *Industrial engineers*
- *Marine engineers*
- *Materials engineers*
- *Mechanical engineers*
- *Mining and geological engineers*
- *Nuclear engineers*
- *Petroleum engineers*

## EDUCATION AND TRAINING

A bachelor's degree in engineering is required for almost all entry-level engineering jobs. College graduates with a degree in a natural science or mathematics may qualify for some engineering jobs, in high demand specialties. Most engineering degrees are granted in electrical, electronics, mechanical, or civil engineering. However, engineers trained in one branch may work in related branches. For example, many aerospace engineers have training in mechanical engineering.

This flexibility allows employers to meet staffing needs in new technologies and specialties in which engineers may be in short supply. It also allows engineers to shift to fields with better employment prospects or to those that more closely match their interests. Most engineering programs involve a concentration of study in an engineering specialty, along with courses in both mathematics and the physical and life sciences. Many programs also include courses in general engineering. A design course, sometimes accompanied by a computer or laboratory class or both, is part of the curriculum of most programs. General courses not directly related to engineering, such as those in the social sciences or humanities, are also often required. Graduate training is essential for engineering faculty positions and many research and development programs, but is not required for the majority of entry-level engineering jobs.

## WORK ENVIRONMENT

Most engineers work in office buildings, laboratories, or industrial plants. Others may spend time outdoors at construction sites and oil and gas exploration and production sites, where they monitor or direct operations or solve on-site problems. Some engineers travel extensively to plants or worksites here and abroad.

Sources: Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2008-09 Edition, on the Internet at http://www.bls.gov/oco/ocos049.htm; SOCRATES, Texas Workforce Commission, on the Internet at http://socrates.cdr.state.tx.us/