

## CAREERS IN ENGINEERING

Engineering offers more career options than any other discipline. It's a profession that can take you from the depths of the ocean to the far reaches of outer space; from within microscopic structures of a human cell to the top of the tallest skyscraper. Listed below are some of the most popular fields of engineering.

**AEROSPACE:** designs and develops some of the world's most marvelous machines – commercial airplanes, fighter jets, telescopes and racecars.

**AGRICULTURAL:** devises ways to make sure crops get the proper nutrients to grow; designs machines that harvest crops; figures out environmentally friendly ways to get rid of agricultural waste.

**ARCHITECTURAL:** works on engineering systems such as the structure or ventilation of a building; focuses on safety, cost and construction methods that are most appropriate.

**BIOMEDICAL:** works with biologists and medical doctors to develop medical instruments, artificial organs, and prosthetic devices.

**CHEMICAL:** turns raw materials into products we use every day; produces pharmaceuticals, soft drinks and make-up; works with petroleum and plastics in the control of pollution.

**CIVIL:** works with buildings, bridges, dams, roads, and other structures; plans and design the construction of high-rise buildings, airports, and water and sanitation treatment centers.

**COMPUTER SOFTWARE:** specializes in all aspects of computer systems including design, construction, and operation; specializes in digital and operating systems, and computer networks.

**ELECTRICAL:** takes energy from fuel cells, hydroelectric plants, turbines and solar panels, and moves it to homes, factories, and businesses.

**ENVIRONMENTAL:** helps to prevent environmental damage and to fix existing problems; assists with the development of water distribution systems, recycling methods, and other pollution control systems.

**INDUSTRIAL:** organizes people, information, energy, materials and machines involved in the production process.

**MATERIALS:** develops, changes, and uses different processes to turn materials (plastics, metals, and ceramics) into useful substances with desirable properties; creates strong new materials that resist corrosion.

**MECHANICAL:** designs and develops machinery, from supersonic jets to toasters to bicycles; works in the area of air conditioning and refrigeration, automotives, welding and robotics.

**MINING:** locates, removes and appraises valuable resources such as coal and minerals located in the ground; lays out mines, and supervises their construction.

**NUCLEAR:** researches and develops methods and instruments that use nuclear energy and radiation; works with nuclear fuel and the safe disposal of nuclear waste; specializes in industrial and medical uses for radioactive materials, such as equipment to treat medical problems.

**PETROLEUM:** works to get oil out of the ground and into other places; involves the drilling and developing of environmentally safe oil fields.

**SYSTEMS:** brings all of the engineering advances in a variety of disciplines together and makes them work harmoniously.

### EMPLOYMENT IN ENGINEERING

(Data source: Bureau of Labor Statistics Office of Occupational Statistics & Employment Projections)

Occupation	Description	Most Common Education Level	2003 Average Wage		Projected Job Growth 2002-2012	
			U.S.	MA	U.S.	MA
Architectural & Civil Drafter	Prepare detailed drawings of architectural & structural features of buildings or topographical relief maps.	PV	\$38,200	\$42,700	4%	10%
Architects, (not Landscape or Naval)	Plan & design structures; private residences, office buildings, theaters, factories, etc.	BD	\$58,600	\$70,900	17%	9%
Biomedical Engineer	Apply knowledge of engineering, biology, and biomechanical principles to the design, development, and evaluation of biological and health systems and products.	BD	\$64,800	\$69,800	26%	23%
Chemical Engineer	Design chemical plant equipment and devise processes for manufacturing chemicals and products, by applying principles and technology of chemistry, physics, and engineering.	BD	\$75,300	\$74,800	0%	-2%
Civil Engineer	Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities.	BD	\$62,800	\$64,100	8%	-2%
Civil Engineering Technician	Apply theory and principles of civil engineering to projects under the direction of engineering staff.	AD	\$38,200	\$49,100	8%	8%
Computer Hardware Engineer	Research, design, develop, and test computer or computer-related equipment for commercial, industrial, military, or scientific use.	BD	\$79,100	\$85,100	6%	12%
Electrical Engineer	Design, develop, test the manufacturing and installation of electrical equipment, components, or systems.	BD	\$70,800	\$78,800	2%	3%
Electrical & Electronic Engineering Technician	Apply electrical and electronic theory under the direction of engineering staff, to design, build, repair, and modify electrical components.	AD	\$45,400	\$47,000	10%	-2%
Electrical & Electronics Drafters	Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for manufacturing, installation, and repair of electrical equipment.	PV	\$42,600	\$50,600	1%	8%
Electro-Mechanical Technician	Operate, test, and maintain unmanned, automated, electromechanical equipment. Assist engineers in testing and designing robotics equipment.	AD	\$40,700	\$41,800	12%	4%

		PV = Postsecondary Vocational Award BD = Bachelor Degree      AD = Associate Degree OJT = On-the-Job Training		2003 Average Wage		Projected Job Growth 2002-2012	
Occupation	Description	Most Common Education Level	U.S.	MA	U.S.	MA	
Electronics Engineer (not computer)	Research, design, develop, test electronic circuits and components for use in fields such as telecommunications, aerospace, propulsion control, acoustics or instrument controls.	BD	\$73,500	\$81,100	9%	4%	
Environmental Engineer	Design, plan, or perform engineering duties in the prevention, control, and remediation of environmental health hazards utilizing various engineering disciplines.	BD	\$64,000	\$66,100	38%	12%	
Environmental Engineering Technician	May assist in the development of environmental pollution remediation devices under the direction of engineer.	AD	\$38,200	\$38,400	28%	15%	
Health & Safety Engineer (not Mining or Inspector)	Promote worksite or product safety by applying knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws. Include industrial product safety engineers.	BD	\$61,400	\$70,900	8%	11%	
Industrial Engineer	Design, develop, test, and evaluate integrated systems for managing industrial production processes including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination.	BD	\$64,000	\$68,600	11%	-6%	
Industrial Engineering Technicians	May study and record time, motion, method, and speed involved in performance of production, maintenance, clerical, and other worker operations.	AD	\$42,900	\$43,100	9%	-3%	
Landscape Architect	Plan and design land areas for such projects as parks, airports, highways, hospitals, schools, and commercial, industrial and residential sites.	BD	\$50,800	\$51,600	22%	31%	
Mechanical Engineer	Perform duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance and repair of centralized heat, gas, water and steam systems.	BD	\$65,200	\$73,100	5%	-1%	
Mechanical Engineering Technician	Apply theory and principles of mechanical engineering to modify, develop, and test machinery and equipment under the direction of engineering staff.	AD	\$42,700	\$45,900	11%	2%	
Mechanical Drafter	Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.	PV	\$42,400	\$49,500	2%	5%	

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Occupation	Description	Most Common Education Level	U.S.	MA	U.S.	MA	
Surveyor	Make exact measurements and determine property boundaries. Provide data relative to the shape, contour, gravitation and location for engineering mapmaking, mining, land evaluation, and construction.	BD	\$41,900	\$43,700	4%	-4%	
Surveying and Mapping Technician	Perform surveying and mapping duties under the direction of surveyor.	OJT	\$30,000	\$41,100	23%	11%	