Health and Safety Engineer Profile

ABOUT THIS OCCUPATION

Working in teams, either with other engineers or with research or manufacturing professionals, biomedical engineers create the specialized products that save lives and make patients safer and more comfortable. Many biomedical engineers are in research, assisting life scientists, chemists, and other scientists to develop and evaluate medical systems and products.

Biomedical engineers are employed in education, industry, hospitals, research facilities of educational and medical institutions, and government regulatory agencies. They often serve a coordinating or interfacing function, using their background in both the engineering and medical fields.

In industry, they may create designs where an in-depth understanding of living systems and of technology is essential. They may be involved in performance testing of new or proposed products. Government positions often involve product testing and safety, as well as establishing safety standards for devices. In the hospital, biomedical engineers may provide advice on the selection and use of medical equipment and supervise its performance testing and maintenance. They may also build customized devices for special health care or research needs.

Biomedical engineers develop devices and procedures that solve medical and health-related problems by combining their knowledge of biology and medicine with engineering principles and practices. Many do research, along with life scientists, chemists, and medical scientists, to develop and evaluate systems and products such as artificial organs, prostheses (artificial devices that replace missing body parts), instrumentation, medical information systems, and health management and care delivery systems. Biomedical engineers may also design devices used in various medical procedures, imaging systems such as magnetic resonance imaging (MRI), and devices for automating insulin injections or controlling body functions. Most engineers in this specialty need a sound background in another engineering specialty, such as mechanical or electronics engineering, in addition to specialized biomedical training. Some specialties within biomedical engineering include biomaterials, biomechanics, medical imaging, rehabilitation engineering, and orthopedic engineering.

Sources are the www.CollegeGrad.com about Career Information website; The National Institutes of Health, OSE Life Works website //science.education.nis.gov; Bureau of Labor Statistics, Engineers www.bls.gov Occupational Outlook Handbook website;

EDUCATION AND EXPERIENCE

The work of health and safety engineers is similar to that of industrial engineers in that they are concerned with the entire production process. They promote worksite or product safety and health by applying knowledge of industrial processes, as well as mechanical, chemical, and psychological principles. They must be able to anticipate and evaluate hazardous conditions as well as develop hazard control methods. They also must be familiar with the application of health and safety regulations.

A bachelor's degree in engineering is required for almost all entry-level engineering jobs. College graduates with a degree in a physical science or mathematics occasionally may qualify for some engineering jobs, especially in specialties in high

demand. 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 are 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 science. Most programs include a design course, sometimes accompanied by a computer or laboratory class or both.

In addition to the standard engineering degree, many colleges offer 2- or 4-year degree programs in engineering technology. These programs, which usually include various hands-on laboratory classes that focus on current issues, prepare students for practical design and production work, rather than for jobs which require more theoretical and scientific knowledge. Graduates of 4-year technology programs may get jobs similar to those obtained by graduates with a bachelor's degree in engineering. Engineering technology graduates, however, are not qualified to register as professional engineers under the same terms as graduates with degrees in engineering. Some employers regard technology program graduates as having skills between those of a technician and an engineer.

Some engineering schools and 2-year colleges have agreements whereby the 2-year college provides the initial engineering education, and the engineering school automatically admits students for their last 2 years. In addition, a few engineering schools have arrangements whereby a student spends 3 years in a liberal arts college studying pre-engineering subjects and 2 years in an engineering school studying core subjects, and then receives a bachelor's degree from each school.

Some employers prefer to hire graduates with special degrees in safety management or occupational safety and health. Others look for people who have a master's degree or some work experience in a related field. In some cases graduates of two-year college programs can become safety engineers after some years of experience as technicians in this field. Undergraduate courses should include behavioral, medical, and social sciences. A list of colleges offering degrees in occupational safety and health is available from the American Society of Safety Engineers. Many companies provide additional training for their employees. Safety engineers continue to study new developments in their field throughout their careers.

A Bachelor of Science (BS) Safety Engineering Degree prepares students in areas such as management safety and engineering safety. A graduate of a Safety Engineering Degree program, will be able to follow the Federal Government's rules and regulations of the industry regarding environmental compliance. Students finishing this program will also be able to qualify for entry-level positions.

Types of courses included in a Safety Engineering BS degree include Occupational Safety and Health, Air Quality Control, Industrial Hygiene Toxicology, Ergonomics, Accident Investigation Techniques, Fire Prevention and Protection, Safety Management, Regulatory Aspects of Safety, Probability, Risk and Statistics, and Transportation Safety.

Sources are the Department of Education and Training Administration's www.careervoyages.com website; Bureau of Labor Statistics, Engineers www.bls.gov Occupational Outlook Handbook website; World Wide Learn website www.worldwidelearn.com; careers.stateuniversity.com online career information website; www.CollegeGrad.com about Career Information website;

CERTIFICATION

NESHTA founded and sponsors, through an independent Board of Certification, the accredited Certified Environmental, Safety and Health Trainer (CET) and the Certified Instructional Technologist (CIT) voluntary professional certification programs. For more than twenty years, these programs have helped to assure employers, workers, regulators and the public that training delivered by CETs and CITs meets the highest professional standards.

The Certified Safety Professional (CSP) is a title/designation awarded by the Board of Certified Safety Professionals (BCSP) to individuals who meet the standards for a safety professional established by Board of Certified Safety Professionals and continue to meet annual renewal and recertification requirements. Examples of the requirements to qualify for the CSP are (1) have either an associate degree in safety and health or a bachelor's degree in any field from an accredited college or university recognized by the Council for Higher Education Accreditation (CHEA) and/or the U.S. Department of Education. Experience alone cannot make up for the academic requirement; (2) have acceptable professional safety practice (6 sub requirements listed); (3) pass the Safety Fundamentals and Comprehensive Practice examinations.

Sources are the Board of Certified Safety Professionals www.bcsp.org website; National Environmental, Safety and Health Training Associates website www.netforumdemand.com;

TRAINING AREAS

Health and Safety Engineers receive additional training in areas that cover a full spectrum of environmental and organizational requirements, covering industry and governmental standards. Training areas include but not limited to:

Hazard Communication (29 CFR 1910.1200 and GISO 5194)

- Basic Toxicology
- Material Safety Data Sheets (MSDS)
- Chemical Handling
- Contractor Safety (GISO 5194)

Hazardous Waste Operations and Emergency Response

- (HAZWOPER 1910.120 & GISO 5192)

Confined Space (permit required GISO 5157)

- Authorized Entrant, Attendant, Rescue

Respiratory Protection (GISO 5144)

- Air Purifying Respirators
- Self Contained Breathing Apparatus (SCBA)
- Airline

Personal Protective Equipment (GISO 3382, 3384, 3385)

- Eye, head, foot, hand protection
- Hearing Conservation (GISO 5095)

Gas Safety

- Compressed cylinders
- Cryogenics

Environmental

- Hazardous Waste Handling
- Hazardous Waste Management
- Environmental Orientation
- Storm Water Pollution Prevention
- Waste Minimization
- Manifesting

Injury and Illness Prevention (GISO 3203)
Accident Investigation
Electrical Safety
Lock Out and Tag Out (LOTO GISO 3314)
Radiation Safety
Laser Safety

Forklift, Man lift, Scissor lift and Crane Safety (GISO 3664)
DOT Training

- Hazardous Material Transportation (HM-181, 126f, 205)

Construction Safety (CSO 1541)

- Excavation Safety Competent Person
- Scaffolding
- Fall protection

Asbestos Operations and Maintenance (O&M)
Emergency Response (GISO 3220 & 5192 & 6151)

- Emergency Response Team (ERT)
- First Responder Awareness & Operations Level
- Hazmat Technician and Specialist Level
- Incident Commander
- Search and Rescue
- First Aid and CPR
- Spill Response and Clean Up
- Decontamination
- Fire Extinguisher and Fire Hose (Live fire)
- Confined Space Rescue
- Fire Brigade

Violence in the Workplace
Bloodborne Pathogens (GISO 5193)
Earthquake Preparedness
Ergonomics

- Back Safety
- VDT Safety

Hot Work

SALARIES AND TRENDS

Biomedical engineers saw mean annual earnings of $79,610 in 2007, according to the BLS. Those working in medical equipment and supplies manufacturing saw slightly higher salaries, at $81,950, while those working in scientific research and development earned $92,870. Careers with the most competition often require applicants to have a master's degree.

Overall engineering employment is expected to grow by 11 percent over the 2006-16 decade, about as fast as the average for all occupations. Engineers have traditionally been concentrated in slower growing or declining manufacturing industries, in which they will continue to be needed to design, build, test, and improve manufactured products. However, increasing employment of engineers in faster growing service industries should generate most of the employment growth.

Biomedical engineers are expected to have 21 percent employment growth over the projections decade, much faster than the average for all occupations. The aging of the population and the focus on health issues will drive demand for better medical devices and equipment designed by biomedical engineers. Along with the demand for more sophisticated medical equipment and procedures, an increased concern for cost-effectiveness will boost demand for biomedical engineers, particularly in pharmaceutical manufacturing and related industries. However, because of the growing interest in this field, the number of degrees granted in biomedical engineering has increased greatly. Biomedical engineers, particularly those with only a bachelor’s degree, may face competition for jobs. Unlike many other engineering specialties, a graduate degree is recommended or required for many entry-level jobs.


National Salary Trend from Indeed.com
biomanufacturing
Salary Index
1.99
1.50
1.00
0.50
Jan '07
Apr '07
Jul '07
Oct '07
Jan '08
Apr '08
Jul '08
Oct '08