

# Engineering and Engineering Technology

## Career Information

### Definition according to the Accreditation Board for Engineering and Technology (ABET):

- **Engineering** is the profession in which knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgment to develop ways to utilize economically the materials and forces of nature for the benefit of mankind.
- **Engineering Technology** is the part of the technological field that requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer.

### Difference between Engineering Technology and Engineering

Technical engineering projects involve research, complex analysis/design, development, manufacturing, test/evaluation, production, operation and distribution/sales of a finished and successful product. Engineers are mostly involved in the initial phase, whereas engineering technologists are mostly involved in the final phases. Their roles overlap in the development, manufacturing and test/evaluation of a product. Therefore, Engineering Technology is all about applying engineering principles to get the job done successfully (Applications Engineering). Engineers are the scientists within the team with in-depth math/science knowledge. Engineering technologists work as technical members of the engineering team with math/science background. Cal Poly Pomona and CSULB offer Engineering Technology baccalaureate programs.

### CA Professional Engineer Licensure

Some industries in CA require a licensed engineer (unlicensed engineers work under the direction of a licensed engineer). Typically, these are industries where public safety is a concern. There are three categories: practice act for those licensed to practice Civil, Electrical, and Mechanical Engineering; title act applies to Agricultural, Chemical, Control System, Fire Protection, Industrial, Metallurgical, Nuclear, Petroleum, and Traffic Engineering; authority act exists for two sub-branches of Civil Engineering: Structural and Geotechnical Engineering which indicates a proficiency greater than what is required for Civil Engineering licensure. <http://www.bpelsg.ca.gov/applicants/appinstpe.shtml>

### Related Organizations/Programs

- Engage in STEM FC <http://engageinstemfc.com/>
- Engineers Without Borders (EWB) <http://ewb-usa.org/>
- FC Engineering and Tech Club (Club Adviser Mareike Claassen)
- National Society of Black Engineers <https://www.nsbe.org/>
- Society of Mexican American Engineers and Scientists <http://mymaes.org/>
- Society of Women Engineers (SWE) <http://societyofwomenengineers.swe.org/>
- Tau Beta Pi-The engineering Honor Society <http://www.tbp.org/home.cfm>

## Academic Information

Engineering and Engineering Technology Transfer Guides are available in the Counseling Center. Also refer to the official engineering agreement between FC and the transfer university in ASSIST.org. Review the information provided by the Engineering Department in the university catalog and in their respective website. The Engineering major is suitable for professional schools requiring math/science foundation, particularly for Pre-Med students. FC offers an AS in Engineering but students may also qualify for the AA in Industrial Technology, AA in IDS/Math & Science, AS in Math, ADT in Math, AA in Medical Technology and ADT in Physics.

### Popular Majors in Engineering

- **Aerospace Engineering**-Aerodynamics, structures, propulsion, flight mechanics and controls, astronautics, and systems engineering.

- **Chemical Engineering**-Design, construction and operation of plants for fuels, plastics, fibers, foods and pharmaceuticals. Due to the strong background in chemistry/materials processing, many chemical engineers also work for industry as environmental engineers.
- **Civil Engineering**-Design, build, operate, and maintain the structures and infrastructure that form our modern society such as buildings, bridges, highways, water supply systems, environmental protection systems, ports, railroads, dams, airports, and many others.
- **Computer Engineering**-Fundamental electrical engineering principles, design of computer hardware and software, and embedded systems.
- **Electrical Engineering**-Fundamentals of electrical engineering including communications, controls, instrumentation, electronics, illumination and power.
- **Industrial Engineering**-Problem solving as it relates to the complex interactions associated with productivity of workers, capital and facilities. Design/implement quality improvement methods for a more efficient, safe, productive work place with proper working conditions.
- **Manufacturing Engineering**-Expertise in the design and analysis of complex computer-controlled manufacturing and automation systems. Determine the processes to use and sequence of operations required to produce the product.
- **Mechanical Engineering**-Quality, well-rounded education that is based on imparting fundamental knowledge and skills in mathematics and pure science as well as engineering science and design.

Some state universities offer unique majors such as: Agricultural Engineering, Architectural Engineering, Biochemical Engineering, Bioengineering, Biomedical Engineering, Energy Engineering, Engineering Geology, Geomatics Engineering, Engineering Physics, Engineering Sciences, Engineering Systems, Environmental Engineering, Facilities Engineering Technology, Marine Engineering Technology, Mechatronic Engineering, Materials Engineering, NanoEngineering, Nuclear Engineering, Structural Engineering, etc. Notes: Game Development (mostly offered in Computer Science) is a popular major. Audio Engineering Option under CSULB's BS in Engineering is currently under consideration for discontinuance and no longer offers the Theme Park Option under this degree.

#### Popular Majors in Engineering Technology

- **Construction Engineering Technology**-Construction materials, drafting, computer applications, construction surveying, structural design, construction equipment, estimating, scheduling, accounting, project management, safety and law.
- **Electronics and Computer Technology**-Apply current engineering methods and design procedures to solve practical technical problems currently found in industry.
- **General Engineering Technology**-Application and design of mechanical and thermal power systems utilizing strength of materials, metallurgy, statics, dynamics, fluid mechanics, thermodynamics and heat transfer.

#### References:

- Accreditation Board for Engineering and Technology (ABET)
- ASSIST
- CA Dept of Consumer Affairs (Board for Professional Engineers)
- CPP, CSULB, CSUF College of Engineering websites
- FC Catalog 2013-2014