



Overview of Aerospace Engineering

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Aerospace engineering is a subset of mechanical engineering that emerged relatively recently in human history when humans began to fly, first in the atmosphere and then into space. It is the science that underpins the design and construction of aircraft and spacecraft (aeronautical engineering) (astronautical engineering). Gliders, missiles, jet fighters, and space rockets are all designed, built, and tested by these engineers. Some work in naval design as well, since some of the rules that govern the flow of air (a fluid) around an aircraft easily translate to the flow of water (also a fluid) around a ship or submarine.

Fluid mechanics, structures, control systems, aeroelasticity, thermodynamics, materials, and electrical engineering are among the engineering sciences that aerospace engineers must master. Specialization is needed because it is one of the more diverse engineering disciplines. Three broad areas of specialization include aeronautics, propulsion, and space vehicles. Aerospace engineering education begins similarly to that of other engineering disciplines. In the United States, all engineers must complete a four-year Bachelor of Science degree from an ABET-accredited institution.

Statics, dynamics, mechanics, thermodynamics, fluid dynamics, and material science are among the many math, physics, and chemistry courses taken. Engineers specialise in their final two years by taking classes in their chosen area. Aerodynamics, structures, sensors, propulsion, and orbital mechanics are some of the topics covered in aerospace engineering. Aerospace engineers may either join the workforce or continue their education after graduation. Some engineers prefer to obtain a Professional Engineer (P.E.) licence, despite the fact that it is not necessary or standard in the aerospace industry. Since there is no aerospace P.E. test, this will usually be in a similar mechanical engineering area.



Passing the Fundamentals of Engineering (F.E.) exam is the first step, followed by several years of work experience and finally the P.E. exam. Starting salaries for aerospace engineers are typically higher than those for civil, mechanical, and industrial engineering graduates, but they are comparable to those for electrical engineering and certain computer science degrees. A master's degree typically leads to higher starting pay, which was about \$70,000 nationally as compared to a bachelor's degree. Of course, your starting salary is highly dependent on your place, current market demand, and even your GPA at graduation. The national average pay for all aerospace engineers is around \$91,000, and the median pay for all aerospace engineers was around \$110,000.

Aerospace engineers often work for the government or defence contractors, necessitating the acquisition and maintenance of a security clearance (Classified, Top Secret, TS/SCI, or TS/SAP), a necessity that may not be required in other fields. Keep in mind that background tests will go back to your 18th birthday, so this might not be the field for anyone who "experimented" heavily with illicit drugs or behaviours during their college years.

So, how does an aerospace engineer use AutoCAD, and what do you expect from it? Due to the nature of the trade, which relies on more advanced software to model parts directly in 3D, AutoCAD use is not widespread across the industry. CATIA is the industry standard, but NX and Pro/Engineer (Creo) are also common. Initial testing and concept validation are also highly reliant on software in aerospace engineering. To model loads, deflections, and heat propagation, finite element analysis (FEA) and applications such as NASTRAN or ANSYS are examples. Computational fluid dynamics (CFD) and applications like Fluent are used to model the flow of air around the design at different speeds and temperatures, while MATLAB can be used to model vibrations and stresses (also applicable to the flow of water).