Mathematics In The World & Workplace

Mechanical Engineer

Mechanical engineers are people who apply engineering physics, engineering mathematics, and materials science principles to design, analyse, manufacture, and maintain mechanical systems.

In this topic I will cover:

- Job Conditions
- Day-in-the-life
- Future Technology
- Workplaces
- Pathway

Job Conditions

- Salary range: $34,000 - $214,000
- Median salary: $101,946

Working Conditions

Mechanical engineers have a high level of social interaction. They generally work in offices and may occasionally visit worksites where a problem or piece of equipment needs their personal attention. In most settings, they work with other engineers, engineering technicians, and other professionals as part of a team. Most mechanical engineers work full-time and some work more than 40 hours a week.

What sorts of Mathematics do they use in this profession?

Mechanical engineering requires College Algebra, Geometry, Trigonometry, Calculus I and II, Linear Algebra, Differential Equations and Statistics. Basic math, calculus and trigonometry are especially important math skills for a mechanical engineer.

Day-in-the-life

On a daily basis, Mechanical Engineers read and interpret blueprints, technical drawings, schematics, or computer-generated reports. They discuss with engineers or other workers to implement operating procedures, resolve system malfunctions, or provide technical information. One of the main responsibilities as a mechanical engineer is to investigate, design, evaluate, install, operate, or maintain mechanical products, equipment, systems or processes to meet requirements.

Mechanical engineers combine mathematics with analytical and problem-solving abilities to develop or repair new equipment and machines. For example, if a mechanical engineer is

designing a chassis, he would use both math and creativity to design a better part that fits within the construct of the car's engine.

Future Technology

Mechanical engineers' employment is expected to rise by 9 percent between 2016 and 2026. Mechanical engineers can work on many types of projects and in many types of industries. As a result of this, their growth rate will differ by the industries that employ them.

Mechanical engineers regularly work on the latest industrial pursuits, particularly in automation and robotics. In the future the fields of alternative energies and nanotechnology will also offer new prospects for occupational growth. Mechanical Engineers will be able to innovate - big or small, human-powered or AI-driven vehicles.

Workplaces

If you are a Mechanical Engineer, you can work in many workplaces. You can work in the Automotive Industry where you can design tools needed to build automobiles better and more efficiently, you can work in the Medical Device Industry where you make lifesaving contributions to the medical field by designing innovative medical devices and you can even work for the Federal Government where you can assist with design and construction of high-risk structures and offices, alternative energy research and development, and even flood control measures and hydroelectricity.

Pathway

For entry into Mechanical Engineering, you at least need a bachelor's degree in Mechanical Engineering. When in high school, students looking forward to becoming a Mechanical Engineer need to be very comfortable with geometry, trigonometry, algebra and calculus, physics, chemistry and biology. Bachelor's degree coursework includes intermediate and advanced mathematics, physical and life sciences, engineering and design. You need to be able to work with various system components, from computer software programming to power systems, and cover technical subjects such as fluid mechanics, thermodynamics, and hydraulics as well. After completing a bachelor's degree you can earn an engineering license and begin looking for a job.

Software Programmer/Coder

Software programmers/coders write programs in a variety of computer languages, such as C++ and Java and debug programs by testing for and fixing errors. They also build and use Computer-Assisted Software Engineering (CASE) tools to automate the writing of some code.

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- Pathway
- Biography

Job Conditions

- Salary range: $36,000 - $174,000
- Median salary: $92,381

Working Conditions:

Computer software engineers typically work in well-lit offices in comfortable surroundings or in computer laboratories. Like other workers who spend large amounts of time in front of a computer terminal typing at a keyboard, they are susceptible to eyestrain, back discomfort and hand and wrist problems. Many computer software engineers interact with co-workers and customers as they attempt to improve software for users. Most software programmers work at least 40 hours a week and may also work evenings and weekends to meet deadlines or solve unforeseen technical problems.

What sorts of Mathematics do they use in this profession?

Binary math is at the core of how any computer code is written. Reading and simple mathematical operations with binary is critical for low-level programming of hardware. Addition, subtraction, multiplication and division is used in almost every program written. Algebra is used to solve simple problems that many computer programmers will encounter.

Day-in-the-life

On a typical day, software programmers monitor functioning of equipment and ensure that the system operates in order with specifications. Almost all software programmers need to have telephone conversations, use email and have group discussions on a daily basis.

Future Technology

Software programming will be a major part of the future as it is building the predicted future of robotics and Artificial Intelligence. Such technology improvements will also make the job easier for the programmers. Individuals working in this field for even only a couple of years have just observed the rise and fall of a few programming dialects and devices. Programming is a unique field, and occupation needs are continually changing, so it's vital to watch out for future patterns and advances that could help the procedure.

Some predicted changes for software programmers in the future would be that AI will become part of every developer’s toolkit without replacing them, a universal programming language will arise, every developer will need to work with data such as statistical data analysis, to non-linear and linear data analysis, to machine learning and even artificial intelligence, and programming will be a core content of the education system.

Workplaces

A large portion of the structure work will be done from an office, yet there will likewise be visits to customer’s workplaces, meetings with planning offices and local government, and obviously site visits. Depending on whether they are independent or utilized by an organization, an Architect may work from their own office, once in a while from home, or from various organization workplaces. Architects use mathematics in their workplace to construct their designs and ideas. They mostly algebra, geometry and trigonometry to plot out their drawings and plans.

Pathway

To be able to complete a bachelor’s Degree in software engineering, students need to earn a high school diploma. Extended courses in the following subjects will help to lay a foundation for undergraduate studies:

- Algebra
- Pre-Calculus and Calculus
- Trigonometry
- Computer Science
- Biology
- Chemistry
- Physics
- Language Arts
- Foreign Language

After finishing high school studies, you will then need to complete the bachelor’s Degree in software engineering to understand digital logic, algorithm design, data structures, project planning, and structured approach to programming. After successfully completing the four-year course, you can then start searching for employment.

Biography

Famous Member of this profession: Mark Elliot Zuckerberg

Mark Zuckerberg is an American technology entrepreneur and philanthropist. He is best known for co-founding and leading Facebook as its chairman and chief executive officer.

Mark is an important member of this profession because his self-taught coding led him to create a social network that has attracted more than two billion people, Facebook.

Architect

Architects are licensed professionals trained in the art and science of the design and construction of buildings and structures that primarily provide shelter. An architect creates the overall aesthetic and look of buildings and structures. Buildings also must be functional, safe, and economical and must suit the specific needs of the people who use them.

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Job Conditions

- Salary range: $34,000 - $174,000
- Median salary: $84,481

Working Conditions:

Architects spend most of their time in offices, where they develop plans, meet with clients, and consult with engineers and other architects. They also visit construction sites to prepare initial drawings and review the progress of projects to ensure that clients' objectives are met. Travel is sometimes required in order to oversee the progress of a project. Approximately 1 in 5 architects work longer than 50 hours per week. Long hours and work during nights and weekends is necessary to meet deadlines.

What sorts of Mathematics do they use in this profession?

Algebra, geometry and trigonometry are fundamentals for taking Calculus, and Calculus is required to complete a degree in architecture.

Day-in-the-life

Most architects invest a lot of energy drafting building plans, inquiring about zoning standards and authoritative reports, getting endorsement to work from government organizations, and structuring miniature models of structures. Numerous architects work extended periods of time split among an office, development work-locales and their home studios to fulfil significant time constraints and to discover other people who offer their dreams in the building arts.

Mathematics is used by architects to express the design images on a drawing that can then be used by construction workers to build that image for the customer. The sizes and shapes of the elements of a design are possible to describe because of mathematical principles such as the Pythagorean Theorem. Mathematics is needed to analyse and calculate structural problems in order to contrive a solution that will assure that a structure will remain stable and standing.

Future Technology

One advancement in technology that will make architecture much easier in the future is Virtual Reality. Architects will be able to observer, walk through, reach out to touch objects and see everything around. VR will also allow them to model and calculate any changes they need to make to their design so satisfy their goals.

Workplaces

Most architects spend much of the day in the office having meetings with customers discuss plans, create renderings and collaborate with colleagues on projects. When a project is available nearby, architects may leave the office periodically to stop by the project site. Location visits often involve checking in with building developers and engineers to ensure the client's objectives are met. Architects use mathematics as their basic tool to construct plans and designs in their workplace. The main mathematical focus of an architect is geometry and trigonometry which is used to define the spatial form of their planned infrastructure and help them measure lengths on their designs.

Pathway

To qualify for an entry into Architecture, you need to at least study a bachelor's degree of Architecture. Parts of this course include history of architecture, fundamental design concepts, properties of materials, interior space and proportions, structural systems, environmental systems, building technology, learning project management, computer-aided design and drafting and building information modelling. To become eligible for state licensing, architecture school graduates must also complete a three-year training period under the supervision of a licensed architect which is known as the Architectural Experience Program (AXP). Algebra, geometry and trigonometry are compulsory areas of mathematics for taking Calculus, and Calculus is required to complete a degree program in architecture.

Meteorologist

A meteorologist is an individual with specialized education who uses scientific principles to explain, understand, observe or forecast the earth's atmospheric phenomena and/or how the atmosphere affects the earth and life on the planet.

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Job Conditions

- Salary range: $34,000 - $150,000
- Median salary: $70,100

Working Conditions:

Meteorologists generally work in safe and neat environment. Some beginning meteorologists are assigned to weather stations in remote parts of the world. Meteorologists in very small stations may work alone.

What sorts of Mathematics do they use in this profession?

Technologies used in meteorology depend greatly on mathematical principles as well as physics. Examples include weather radar, chart usage and interpretation and numerical weather prediction. You need to be able to do basic algebra, linear algebra, trigonometry, calculus, multivariable calculus, statistics and differential equations.

Day-in-the-life

On a daily basis, meteorologists communicate climate conditions, figures, or extreme climate admonitions to the open through TV, radio, or the web or give this data to the news media. They gather information from sources to present in front of the public. For example, surface stations, satellites, climate authorities, or radar for use in meteorological reports or gauges.

Mathematics is used in meteorology as computer modelling that uses calculus and is able to more meticulously predict upcoming weather.

Future Technology

AI could be employed to improve the accuracy and reliability of weather forecasting. AI can be used to use computer-generated mathematical programs and computational problem-solving methods on vast data sets to identify patterns and make a relevant hypothesis. Due to the complexity involved in weather prediction, scientists are now using AI for weather forecasting to obtain refined and accurate results.

Workplaces

Climate is all over the place, and meteorologists can be discovered everywhere throughout the world doing a wide range of employments. The five primary spots meteorologists work are for TV/Radio stations, counselling organizations, instructive offices, the military, and the National Oceanic and Atmospheric Administration (NOAA). Meteorologists use mathematical knowledge and skill to predict and forecast upcoming weather conditions and present them to the public through operating in these special workplaces.

Pathway

To qualify for an entry into meteorology, you should start from taking the right education while in high school. Try to take as many mathematics and science courses as possible as well as English and computer science. After finishing education at high school, usually you will then need to complete a bachelor’s degree in meteorology or atmospheric science. Technologies used in meteorology rely greatly on mathematical principles and physics. Examples include weather radar, chart usage and interpretation (such as the hodograph), and numerical weather prediction, so mathematical training is the core to success in this occupation.

Written Comparison

Mechanical engineers, software programmers, architects and meteorologists all have similarities and differences in the field they work in and what results they produce. All of these professions use technology and application of mathematics to produce these outcomes.

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