

# Smart Futures: Working in Engineering

What skills are needed?  
What are the career paths?  
What subjects should I study?

Smart Futures is a government-industry programme providing secondary school students in Ireland with FREE access to **role models** working in **science, technology, engineering and maths (STEM)**.

Keeping up to date on the many career paths available in STEM isn't easy. It's a fast-moving area, with multiple routes to entry and a high demand for graduates. From designing video games and improving medicines to space exploration and environmental research, students need real insights into the many exciting and diverse STEM career opportunities in Ireland.

#### DID YOU KNOW?

Over 170,000 people work in the science, technology and engineering sectors in Ireland

Smart Futures offers **free career talks** to all secondary schools in Ireland to give students the chance to ask practical questions about working in STEM and encouraging them to look beyond stereotypes.

Teachers, guidance counsellors, TY coordinators etc. can register via [www.steps.ie](http://www.steps.ie) and request career talks at any time of the year. Talks are typically 40 mins, taking place in your classroom.

These talks are great for inspiring students to think differently about how they choose their school subjects, life after school and preparing for jobs of the future!

#### Why not invite a STEM volunteer to attend your parent evenings?

Visit [www.SmartFutures.ie](http://www.SmartFutures.ie) to read 100+ STEM career stories, watch videos, download posters and career infographics.

Smart Futures is managed by Science Foundation Ireland in partnership with Engineers Ireland.

## Working in Mechanical Engineering

Mechanical engineers use their problem-solving skills to design machines and technologies to improve our world. They create all sorts of machines and devices, from jet engines to robots to medical devices to mobile phones. Mechanical engineers often work at the leading edge of innovation, on projects such as driverless cars, alternative energy sources, development of new materials and augmented reality glasses.

**Also look up:** Biomedical Engineer, Aeronautical Engineer, Mechatronic Engineer, Electromechanical Engineer

#### What does the job involve?

- Designing and developing new energy and alternative energy systems
- Inventing robotics for use in industry, space and healthcare
- Designing new communications and entertainment devices
- Making engines faster and more fuel-efficient
- Developing new materials to support new products

#### What skills are needed?

- Problem-solving abilities
- Communication skills
- Analytical & creative thinking
- Team work

#### Typical employers

- Industry
- Consultancies
- Government bodies
- Research institutes

#### Typical qualifications

Typically, a degree or a Masters in engineering or mechanical engineering. Many students choose common entry engineering and specialise later. Alternative routes include Post-Leaving Certificate (PLC) qualification in a related course. These students often progress to a bachelor's degree later.

#### DID YOU KNOW?

250 medical technology companies employ 25,000 people in Ireland

## Working in Civil, Structural or Environmental Engineering

Civil engineers improve and protect the world around us, through planning, designing and building the facilities we use every day, from houses to factories to transport systems. Structural engineering is a division of civil engineering, where the focus is on large structures such as bridges, office blocks, roads, railways, airports and canals. Environmental engineering is another division of civil that takes on environmental challenges, such as the construction of water and wastewater treatment plants, air pollution management and sustainability issues.

**Also look up:** Building Services Engineering, Energy Engineering

### What skills are needed?

- Problem-solving abilities
- Analytical & creative thinking
- Communication skills
- Team work

### What does the job involve?

- Designing, planning and constructing new buildings and structures that meet specific requirements, budgets and timelines
- Designing new transport infrastructure and improving existing systems
- Assessing the environmental impact of proposed activities or structures, and proposing sustainable solutions
- Devising innovative solutions for cleaning waste water, reducing air pollution, preventing floods and harnessing renewable energy

### Typical employers

- Construction industry
- Consultancies, architects & contractors
- Local authorities
- Research institutes

### Typical qualifications

Typically, a degree or a Masters in civil, structural or environmental engineering. Many students choose common entry engineering and specialise later. Alternative routes include Post-Leaving Certificate (PLC) qualification in a related course. These students often progress to a bachelor's degree later.

## Working in Chemical Engineering

Chemical engineers develop the industrial processes used to make everyday products such as food, drink, drugs, cosmetics, plastics and electronics. A chemical engineer can be involved in all kinds of industrial process developments, from the large-scale manufacture of medicines to the design of water treatment plants to researching new compounds for cosmetics. Around 120 international pharmaceutical companies have bases in Ireland, including 9 of the top 10 global pharma companies.

**Also look up:** Process Engineering

### What skills are needed?

- Problem-solving skills
- Creative & analytical thinking
- Team work
- Communication

### What does the job involve?

- Developing new, efficient manufacturing methods for products, from paint to food
- Researching new methods for the safe and efficient mass production of medicines
- Designing and constructing chemical manufacturing plants
- Designing safety procedures to be used by workers in chemical factories

### Typical employers

- Manufacturing industry
- Research institutes
- Healthcare and food companies
- Government agencies

### Typical qualifications

Typically, a bachelor's degree in chemical engineering. Many students choose common entry engineering and specialise later. Alternative routes include Post-Leaving Certificate (PLC) qualification in a related course. These students often progress to a bachelor's degree later.

Explore more STEM career pathways at [www.SmartFutures.ie](http://www.SmartFutures.ie)

### DID YOU KNOW?

In a US survey of the top 500 companies on the stock market, 33% of CEOs had an engineering degree

## Next Steps?

So now you've read some examples of STEM careers, there are so many more still to explore! From nanotechnology to games development, robotics, artificial intelligence and even space exploration, engineering offers a fulfilling career, with skills in demand across the globe, to help improve lives and the world we live in.

Thinking about #STEMcareers? Follow your passion and #DoWhatYouLove!

### Who can I talk to?

Before choosing your school subjects, CAO options or PLC course, ask your teacher, guidance counsellor or TY coordinator to register on [www.steps.ie](http://www.steps.ie) for FREE career talks. Real people working in STEM can visit your class and answer your questions. Also, visit [www.smartfutures.ie](http://www.smartfutures.ie) to see 100+ examples of STEM career stories, videos and more!

### How can I get involved?

There are hundreds of free STEM-related events and activities going on around the country, here are just a few:

- ScienceWeek.ie (November)
- EngineersWeek.ie (March)
- SpaceWeek.ie (October)
- SciFest.ie
- MathsWeek.ie (October)
- TechWeek.ie (April)
- CoderDojo.com
- GirlsHackIreland.org

### Further resources?

Looking for information on PLCs, apprenticeships, course points or subject requirements? Visit:

[www.CareersPortal.ie](http://www.CareersPortal.ie)  
[www.CareersNews.ie](http://www.CareersNews.ie)  
[www.Qualifax.ie](http://www.Qualifax.ie)  
[www.Collegeaware.ie](http://www.Collegeaware.ie)

[www.GradIreland.ie](http://www.GradIreland.ie)  
[www.plccourses.ie](http://www.plccourses.ie)  
<http://FIT.ie>  
[www.steps.ie](http://www.steps.ie)

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