

Engineering as a Career

[This section has been duplicated in the Student Booklet]

- The work of engineers is visible in almost every aspect of society.
- Engineering has been a key factor in Ireland's recent economic growth.
- A career in engineering is challenging, enjoyable and rewarding.
- Engineering involves a broad range of transferable skills, and many engineers are employed outside traditional technical areas.
- An engineer is seven times more likely to become a chief executive of a company than any other type of professional.
- Engineering is particularly suited to people who are curious about the way things work, how things are designed and made, and how scientific principles are used to produce useful products and services.
- In the past, relatively few female students studied engineering, partly because their schools often did not provide higher level mathematics or science subjects. However, nowadays a large number of female students are choosing to study engineering, and women engineers are to be found in every area of the profession.

What are the different types of engineering?

Different Types of Engineering

- Chemical and Process
- Civil
- Electrical
- Electronic
- Mechanical
- Aeronautical
- Biomedical
- Building Services
- Computer and Software
- Food and Agricultural
- Manufacturing and Industrial
- Materials
- Mechatronics/Electromechanical
- Structural

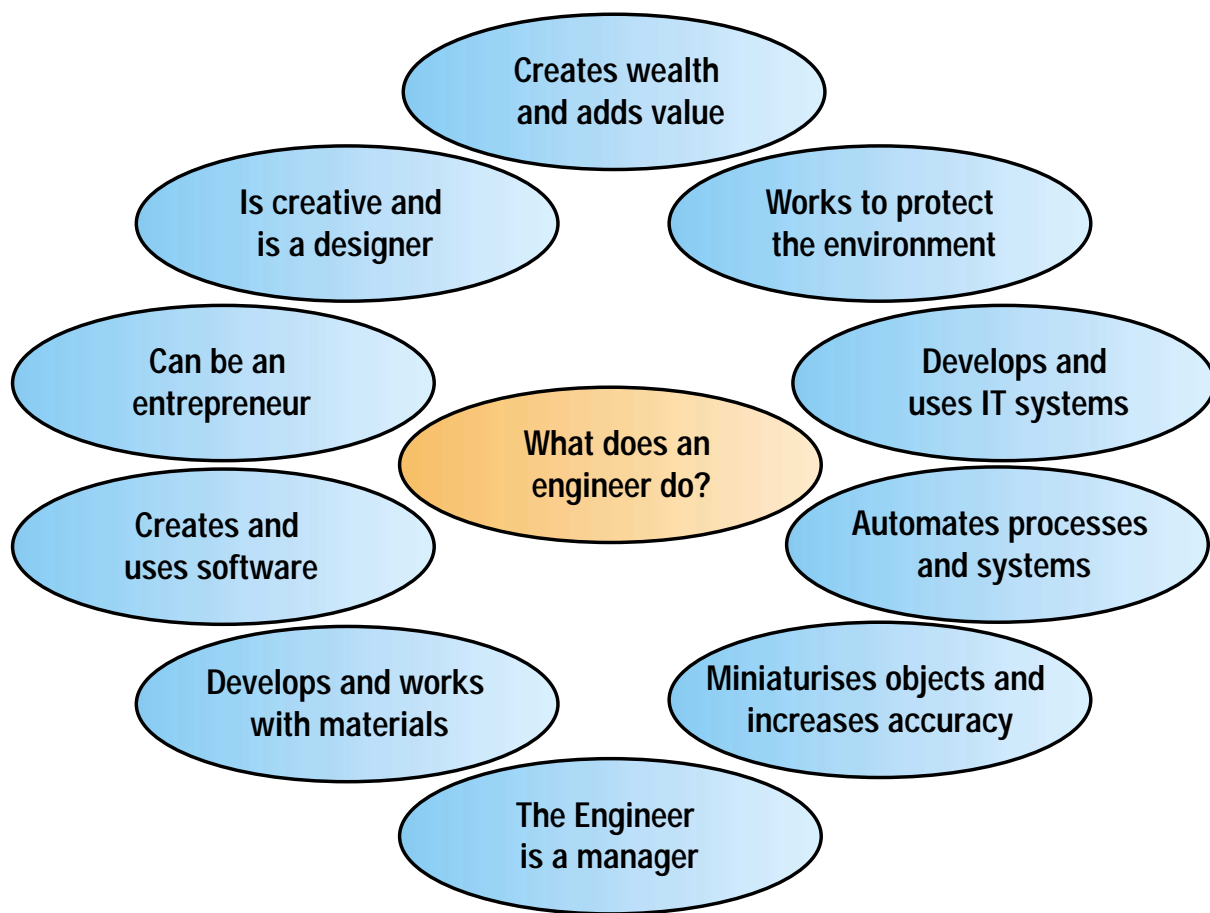
Engineering as a Career (continued)

What areas are engineers working in?

- Design
- Manufacture
- Environmental protection
- Starting new companies
- Using computers and information technology
- Automation
- Materials
- Research and Development
- Wealth creation
- Management

- The work of engineers can be seen in almost every aspect of society. It underpins all aspects of our lives.
- A career in engineering is challenging, enjoyable and rewarding.
- Engineering involves a broad range of transferable skills, and many engineers are employed outside traditional technical areas.

What does an engineer actually do?

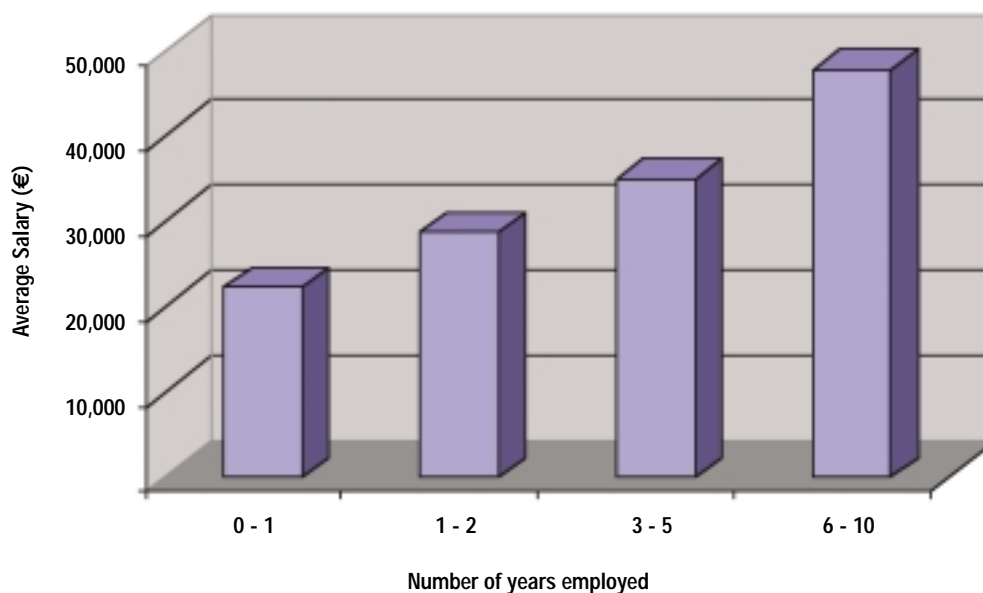


Engineering as a Career (continued)

- Engineering is the application of scientific and mathematical principles to real-life problems.
- The engineer looks for a practical solution through examining the problem in a systematic and scientific manner.
- The engineer solves problems in a systematic manner taking the environment, social and economic factors into account
- Engineering is about dynamic, people-orientated working environments, get-up-and-go attitudes, organisational skills, travel and the ability to communicate effectively with people from all walks of life.
- The engineer also has the satisfaction of seeing a tangible end result for his or her work.

What salary does an engineer earn?

- The guideline to the salary an engineer earns is shown above.
- Engineers are amongst the best earners of all graduates.
- Although technicians normally earn less than engineers, their earning potential is also very good.



Engineering as a Career (continued)

What skills and competencies are needed in engineering?

The competencies required by the engineer include:

- Specialist engineering competence with a solid technical knowledge and an appreciation of sustainable development, environmental considerations and project and technology management.
- Methodical competence to implement this specialist knowledge in a constructive and methodical manner with high quality business skills.
- System competence to be able to think beyond the limits of one's own particular engineering discipline.
- Social competence with the ability to work and interact effectively in teams of people in a multicultural environment.
- Personality to handle the complex issues and the management of others in a competent manner.

Check to see if you are suited to engineering

What it takes to make a good engineer

- Competence in mathematics
- Natural curiosity and an enquiring mind
- A willingness to challenge the status quo
- A liking for getting things done
- A desire to see the results of your work in the physical sense

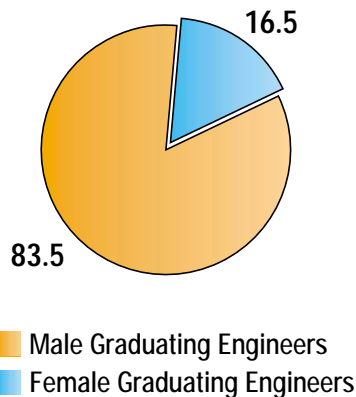
What Leaving Certificate subjects are necessary or useful in studying engineering?

- A good understanding of the physical sciences is also essential. Subjects such as physics, chemistry and applied mathematics underpin the curricula of engineering programmes.
- In most cases honours mathematics (higher level, grade C) at Leaving Certificate level is an entry requirement for degree programmes in engineering.
- Technician programmes do not require higher level mathematics, and some technician courses can lead to a degree.
- Not having Leaving Certificate mathematics at higher level does not preclude you from gaining a degree in engineering.

Engineering as a Career (continued)

Women in engineering

- A career choice which is far from gender specific.
- Women who study engineering perform equally as well as their male counterparts and also find it to be a very rewarding profession.



- There is, however, a large gender imbalance as can be seen from the graph above.
- *With six out of every ten new jobs created in the future predicted to be in the fields of science, engineering or technology, we should be encouraging both female and male students into these areas.*
- Programmes run by Women in Technology and Science (WITS) are under way [www.witsireland.com].
- Mentorlink.ie investigates the gender issues associated with engineering [www.mentorlink.com]

Choosing a discipline of engineering to study

1. What am I most interested in, i.e. how cars work, how mobile phones work, how they make corn flakes, how they make buildings earthquake proof, how computers work ...?
2. Do the results of my aptitude tests reflect my interests?
3. Would I prefer to work outdoors or do I want to be indoors?
4. Would I like to be doing hands-on work in the laboratory or factory floor, or would I prefer to be working with a computer or interacting with people?
5. Do I like design work – which type of design work appeals to me most?
6. Do I want to study a course which is primarily practically orientated or one which mixes theory and hands-on work?
7. How much do I know about the quality of the course I am considering? For example, what is the reputation of the course among employers? Are the lecturers leaders in their fields?
8. Do I want to do an industrial placement for six months or would I prefer to have the freedom to find my own jobs during the summer holidays?
9. Do I want to study a foreign language on my course?
10. Do I want to be very specialised within my field of engineering, i.e. studying materials engineering as opposed to a more broad-based mechanical engineering course?
11. Do I want to study on an accredited course? Choice of course – other issues

Engineering as a Career (continued)

Issues to Consider in Choosing a Course

1. Can I afford to move away from home to the location of the course I wish to study? (Some cities and towns are more expensive than others).
2. Would I be happy to move away from home?
3. How far away from home would I be living (you may not relish the thought of travelling from Donegal to Cork every few weekends)?
4. Do I know anyone going to the same college?
5. How many years am I willing to spend in college?
6. What do I know about the college itself, its academic profile, its leisure activities and surroundings?
7. What is the accommodation situation?

If you are undecided: Select a course which has common entry to a number of engineering fields _ undenominated course.

Remember: For many graduate jobs, getting a good honours degree is more important than the type of engineering degree you studied.

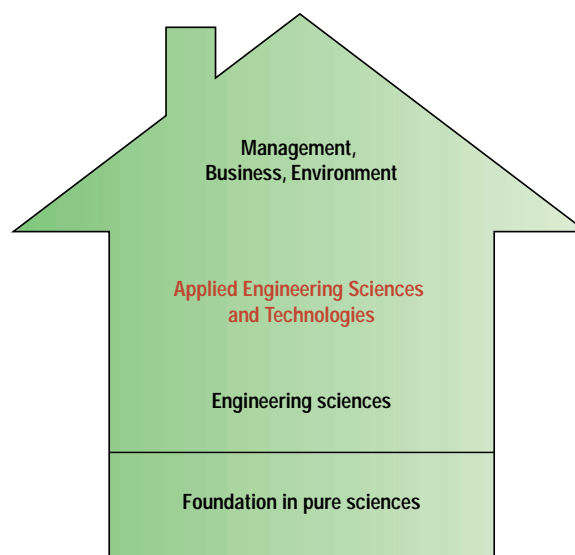
Use College Open Days to get a better understanding of what each type of engineering involves.

Talk to students and staff in the colleges.

Also: Use college websites and prospectuses

Subjects studied during an engineering course?

Diverse range of topics covered. Mathematics is a subject you will encounter every year – either directly or indirectly!



Engineering as a Career (continued)

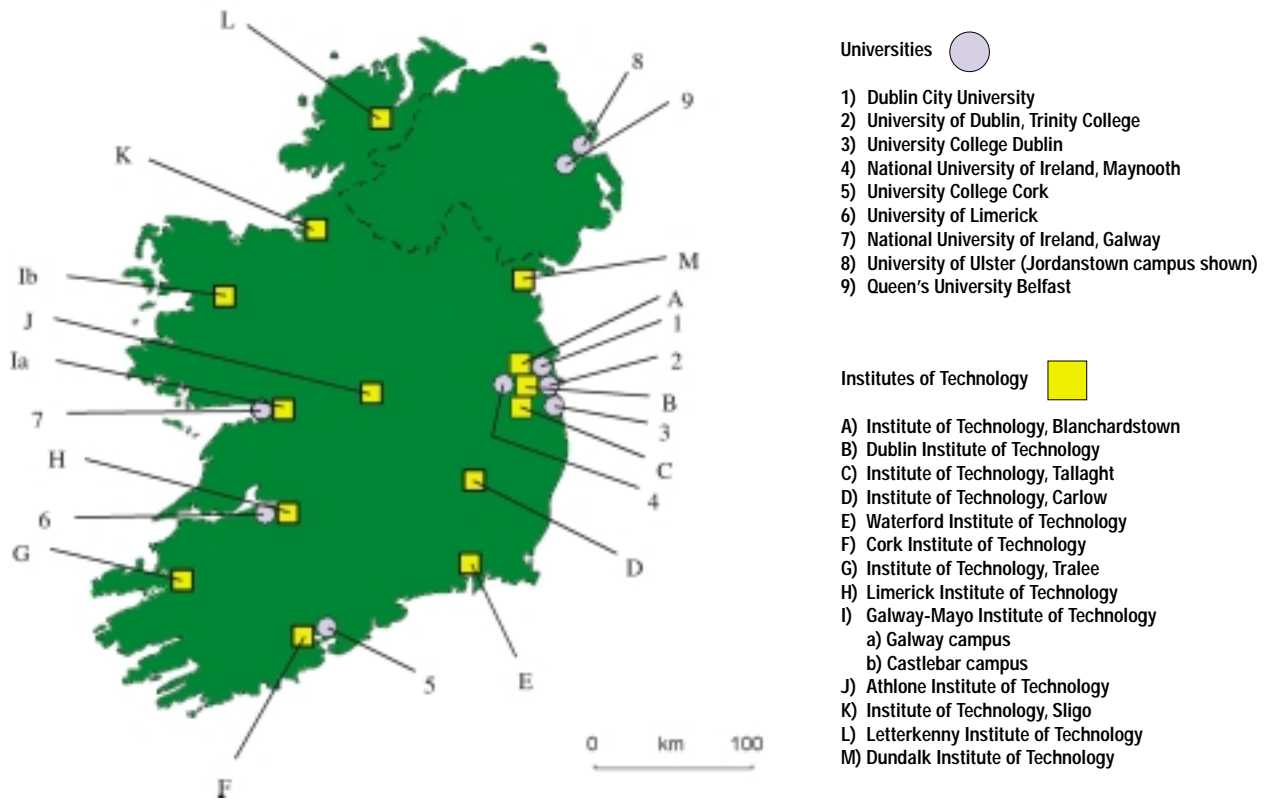
First Year: Chemistry, physics, mathematics, engineering subjects, language, computer science

Second Year: Detailed treatment of your discipline of engineering – engineering science

Third Year: Applied engineering sciences and technologies

Final Year: Applied engineering sciences, project, management, business, environment, engineer in society

Where can you do an engineering course in Ireland?



Note: The colleges of higher and further education in Northern Ireland are not included in this illustration

Engineering as a Career (continued)

Engineering courses on offer in Ireland

There is a wide range of courses on offer in universities and institutes of technology. See details in book Engineering as a Career or go to the websites of the individual faculties or schools.

Table below lists accredited engineering degree programmes in universities in Ireland.

| | Chemical and Process | Civil/Structural | Electrical | Electronic | Mechanical | Aeronautical | Agricultural and Food | Building Services | Communications | Computer and Software | Environmental and Civil | Industrial | Manufacturing | Materials | Production |
|---------------------------------------|----------------------|------------------|------------|------------|------------|--------------|-----------------------|-------------------|----------------|-----------------------|-------------------------|------------|---------------|-----------|------------|
| Queen's University Belfast | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | ✓ | | | ✓ | | |
| University College Cork | ✓ | ✓ | ✓ | ✓ | | | | | | | | | | | |
| Dublin City University | | | | ✓ | | | | | ✓ | ✓ | | | | | |
| University College Dublin | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | | | | | | |
| University of Dublin, Trinity College | | | | ✓ | ✓ | | | | | ✓ | ✓ | ✓ | ✓ | | |
| NUI, Galway | | ✓ | | ✓ | ✓ | | | | ✓ | | | ✓ | | | |
| University of Limerick | | | | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | | ✓ |
| NUI, Maynooth | | | | ✓ | | | | | | ✓ | | | | | |
| University of Ulster | | ✓ | | ✓ | ✓ | | | | | | ✓ | | | | |

Engineering as a Career (continued)

The Engineering Profession in Ireland

Engineering is a profession with a long tradition in Ireland.

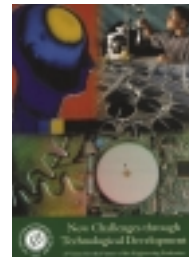
Irish engineers have designed and built systems throughout the ages - from the earliest passage tombs in Newgrange to the computer chips of today.



Extensive infrastructural development

The engineering profession has developed significantly over the last ten years. Some of the changes include:

- New products being developed and becoming obsolete at a much faster rate (shorter life cycles).
- Companies have been characterised by a shift from manual operations to knowledge driven and highly automated organisations.
- New technology areas provide opportunities for new companies to grow over a short number of years into multimillion euro organisations.
- The need for engineers and technicians has increased significantly.



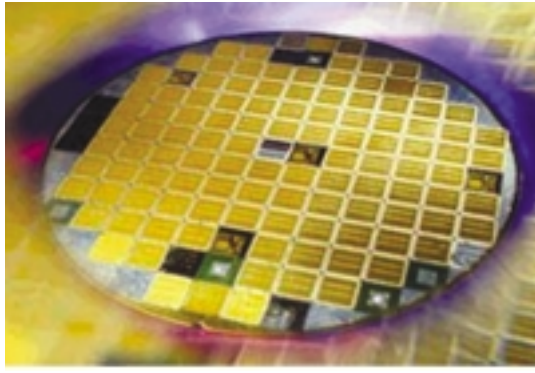
Students of engineering in Ireland are fortunate in that the government has recognised that our future wealth lies in the strength of the people and, in turn, in the strength of the members of the engineering profession.

Engineering as a Career (continued)

Examples of modern Irish engineering



Luas



Silicon Wafer



Infrastructural development



Offshore energy



Taney Bridge, Dundrum



Croke Park redevelopment



Croke Park - the finished article!

Frequently Asked Questions about working in the engineering profession

How much does an engineer earn?

A 2003 survey has shown that the median salary of an ordinary member of the IEI, who has been employed 3-5 years, is €37,500 per annum. The amount that individuals can earn will depend upon the particular engineering discipline in which they are employed and also upon individual career progression. Many employers offer other benefits such as stock options, healthcare plans and pensions, which make employment packages significantly more attractive.

It should be noted that these figures only apply to those who follow into the engineering profession. There exist numerous other options for engineers, which may prove more lucrative, for example management positions.

Are Irish engineering qualifications internationally recognised?

Anyone who completes a course of study that is accredited by the Institution of Engineers of Ireland (IEI) is automatically accepted by certain international engineering bodies for membership purposes. This is possible because the IEI is a signatory of a number of international agreements, such as the Washington Accord, the Sydney Accord and the Dublin Accord.

Can I work abroad as an engineer?

As an Irish engineer with an internationally recognised qualification, you are sought after all around the world. It is important, however, to investigate the requirements of foreign employers on a country-by-country basis. Some employers may insist upon relevant work experience and the level of language skills required will depend on the country. For work outside the EU, many countries may have visa requirements that need to be fulfilled. One way of overcoming this is to gain employment with a large engineering company that has multiple offices worldwide, with the possibility of moving between locations.

Frequently Asked Questions (continued)

What do the terms Chartered Engineer, Associate Engineer and Engineering Technician mean?

The title Chartered Engineer (CEng) is awarded to engineers who hold an accredited engineering honours degree, who have completed a minimum of four years of relevant work experience and have satisfactorily completed a professional review.

The title Associate Engineer (AEng) is awarded to engineering technologists who either:

- hold an approved BTech or BSc degree and have completed three years of relevant work experience and have satisfactorily completed a professional review.

or

- hold an approved National or Technical Diploma in engineering and have completed four years of relevant work experience and have satisfactorily completed a professional review.

The title Engineering Technician (EngTech) is awarded to engineering technicians who hold an approved Higher or Technician certificate in engineering and who have completed three years of relevant work experience and have satisfactorily completed a professional review.

I am interested in going into management. Why should I study engineering?

A large percentage of engineers progress to senior management roles in business and industry. Engineering provides a sound, systematic and scientific base that is invaluable for all areas of management.

Summary

Working in the Engineering Profession

- Engineering graduates can earn significantly more than most other graduates, and the salaries of engineers continue to rise steadily in the years after leaving college.
- There are a variety of information sources available for researching career options:
 - Recruitment events/shows
 - Engineering institutions
 - Previous graduates
 - University and institute of technology careers services
 - Job advertisements in newspapers and technical magazines
 - Company websites
 - Networking
- The Institution of Engineers of Ireland is the body which represents the engineering profession, and which accredits engineering courses. The Institution publishes two magazines for its members: BASE magazine for engineering students and the Engineers Journal for engineers working in the profession.
- All engineering graduates are encouraged to engage in lifelong learning and to participate in continuing professional development (CPD) programmes.
- There are many examples of famous engineers, including artist and engineering pioneer Leonardo Da Vinci, Irish structural engineer Peter Rice, astronaut Mae Jemison and even film director Alfred Hitchcock.