ENGINEERS IRELAND

Engineering 2019

A barometer of the profession in Ireland

A COMMUNITY OF CREATIVE PROFESSIONALS DELIVERING SOLUTIONS FOR SOCIETY

www.engineersireland.ie

Table of contents

Foreword

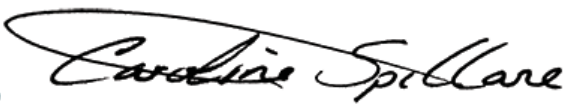
Welcome to Engineering 2019, the second in a series of reports by Engineers Ireland tracking developments in the engineering profession in Ireland. Since the first report, 12 months ago, the engineering sector has continued to flourish. This report presents a wide range of insights across engineering employment, perspectives and education based on information from our engineer members, engineering employers and the public.

Engineers are critical to Irish society, environment and economy – from clean water supplies and safe buildings to renewable energy and new manufacturing technologies. If Ireland is to remain an attractive destination for high-value foreign direct investment, if we are to meet our goals in housing and broadband, and if we are to realise the ambitions mapped out in Project Ireland 2040, a ready supply of talented engineers is fundamental. However, the reality is that the number of students moving into third-level engineering and technology sectors needs to be much larger to meet our country's current and future needs.

This report shows that Junior Certificate students have a strong appetite for STEM and that engineering is considered to be a rewarding career for young people. Now, more than ever, we need to encourage students to retain this interest and advance their knowledge of STEM at senior level in 5th and 6th year and consider a future career in engineering. I would strongly encourage young people, and particularly young women, to consider a career in engineering and the fantastic and expanding opportunities that exist in the engineering profession.

Engineers Ireland awards professional titles recognising the career progression, ethical standards and achievements of our members. In the Republic of Ireland, we are the sole authority to award the title of Chartered Engineer and we mark the 50th anniversary of the title this year. As this report shows, the value of the professional expertise, leadership and ethical practice of these engineers is recognised in the industry.

In an era of digitalisation, and to overcome the challenges faced by our society, we need to grow engineering as a creative, analytical and diverse profession. Engineering 2019 takes up these issues, presenting clear data to inform the work of Engineers Ireland and our stakeholders. We hope it will be a useful resource for engineers, educators, policy-makers and recruiters.



Caroline Spillane
Director General

March 2019

Executive summary

Engineering 2019: A barometer of the profession in Ireland charts the remarkable growth in the engineering sector in Ireland. The report outlines developments in engineering employment, perspectives and education, based on information from approximately 2,000 engineers, 1,000 statistically-representative members of the public and 100 engineering employers. This information is complemented by the analysis of data collected by State agencies and other organisations. A set of 10 key performance indicators for the profession has been developed and the results are shown overleaf.

In general, Engineering 2019 demonstrates that engineers are in demand across all sectors and that confidence remains high. For example, 77% of engineering employers' financial position greatly improved or slightly improved in 2018, while 89% expect their financial position to improve in 2019. These organisations would like to recruit more than 6,000 engineers in the next year. Demand is strongest in consulting engineering companies with Civil & Building Engineers highly sought after. In this context, engineering salaries have continued to rise. A graduate engineer can expect to earn €33,750, 21% (or €5,000) more than five years ago.

However, there are serious skills shortages in the sector. The supply of third level graduates (particularly from Level 7 and Level 8 courses) and professional engineering apprentices is simply insufficient to meet the needs of our growing society. Almost all (94%) engineering employers consider a shortage of experienced engineers to be a barrier to growth. The National Skills Bulletin, which informs Government employment and education policy, now recognises shortages in almost all engineering occupations. Employers are not just looking for core engineering skills, they regard effective communication and teamwork as just as (or even more) important than fundamental engineering knowledge.

The public holds engineers in extremely high regard: 78% think that engineering is a rewarding career for young people, while 80% believe engineers are essential to reduce risks to public safety and health. However, we can do more to inform the public about our profession: just 43% of Irish adults would feel confident explaining what an engineer does and, worryingly, this figure is just 35% for parents of secondary school children. Meanwhile, the gender gap in engineering persists, just 13% of last year's graduates are female.

6,014

Demand for engineering **recruits** in **2019**

Indicator 1 Pg: 5

78% Agree

Engineering is a **rewarding career choice** for **young people**

Indicator 4 Pg: 12

84,048

Leaving Certificate **higher level STEM sittings**

Indicator 7 Pg: 23

€33,750

Median salary, Engineer with **1-2 years' experience**

Indicator 2 Pg: 9

€50,000

Median salary, Chartered Engineer with **6-10 years'** experience

Indicator 3 Pg: 10

62% Agree

There are **plenty** of **engineering jobs** in **Ireland today**

Indicator 5 Pg: 13

43% Agree

I would feel **confident explaining** what an **engineer does**

Indicator 6 Pg: 13

3,865

Graduates from **Level 7** and **Level 8** courses

Indicator 8 Pg: 26

1,031

Graduates from **Level 9** and **Level 10** courses

Indicator 9 Pg: 27

13%

Percentage of **graduates (Levels 7-10)** who are **women**

Indicator 10 Pg: 30

Introduction

This is the second in the series of Engineering reports, the barometer of the engineering profession in Ireland. Last year's report established a number of baselines across engineering employment, perspectives and education which are updated and analysed in this report. Where possible, five year trends are also examined. Before delving into this information, it is useful to consider some economic and policy developments in the past year.

Economy and Brexit

According to the Department of Finance, the Irish economy grew by approximately 7.5% in 2018 and was again the fastest growing economy in the EU. Even when the distorting effects of multinationals are stripped out, the economy grew by approximately 5% with strong increases in domestic demand and employment. There was impressive growth in sectors in which large numbers of engineers work, such as ICT and Construction (Section 2 of this report explores economic trends in engineering).

Notwithstanding this growth, the United Kingdom's decision to leave the European Union colours every aspect of Ireland's economic future, and the associated uncertainty has been impacting the professional activity of engineers across the Republic of Ireland, Northern Ireland and Great Britain. To ensure that our members' ability to work as an engineer across jurisdictions is not impacted negatively by Brexit, Engineers Ireland has reached agreements with our peer organisations in the UK. We continue to monitor the situation as Brexit unfolds.

Digitalisation and skills

Digitalisation is becoming pervasive in our daily lives and is driving a level of connectivity never before seen in society. New connectivity and production technologies are ushering in a revolution in global manufacturing generally referred to as Industry 4.0 – the 4th Industrial Revolution. At the same time, new technologies such as Building Information Modelling (BIM) are disrupting the construction industry. These developments pose major challenges and opportunities for Ireland, not least in the area of skills.

The skills required to perform many jobs are transforming rapidly such that the demand for manual skills is falling while the need for analytical thinking and innovation continues to grow (see table on next page). The World Economic Forum have referred to a 'reskilling imperative'. In this context, it is positive to note Government's 'Technology Skills 2022: Ireland's Third ICT Skills Action Plan' which targets more than 47,000 graduates with high level ICT skills by 2022. Other policy initiatives include increases in the Training Levy, the €300m Human Capital Initiative and the Future Jobs Initiative. Sections 3 and 4 of this report analyse the demand and supply of engineering skills in Ireland.

Comparing skills demand, top ten

Trending, 2022

Analytical thinking and innovation
Active learning and learning strategies
Creativity, originality and initiative
Technology design and programming
Critical thinking and analysis
Complex problem-solving
Leadership and social influence
Emotional intelligence
Reasoning, problem-solving and ideation
Systems analysis and evaluation

Declining, 2022

Manual dexterity, endurance and precision
Memory, verbal, auditory and spatial abilities
Management of financial, material resources
Technology installation and maintenance
Reading, writing, math and active listening
Management of personnel
Quality control and safety awareness
Coordination and time management
Visual, auditory and speech abilities
Technology use, monitoring and control

Source: World Economic Forum, The Future of Jobs Report 2018

Engineering 2019

The purpose of Engineering 2019 is to measure, analyse and learn from significant trends in the engineering profession in Ireland. The data contained herein will be useful not only for engineers, but also for those considering entering our profession, for industry, for educational institutions and for Government policy.

The report is based on three bespoke surveys conducted between October 2018 and February 2019 with:

(i) 108 engineering organisations (employing a total of 36,778 engineers),
(ii) 1,908 qualified engineers, and
(iii) 1,000 people statistically-representative of Irish adults.

This information is complemented by summaries of data collected by other organisations such as the Central Statistics Office, Higher Education Authority and State Examinations Commission.

The report is structured as follows: Section 2, Employment, examines financial position and outlook, recruitment and salaries; Section 3, Perspectives, outlines the opinions of the public, employers and qualified engineers on opportunities, skills and risk of harm; Section 4, Education, presents data on STEM and engineering education from Junior Certificate to postgraduate studies and apprenticeships. The concluding section of the report summarises key trends in the engineering profession in Ireland.

Engineering employment

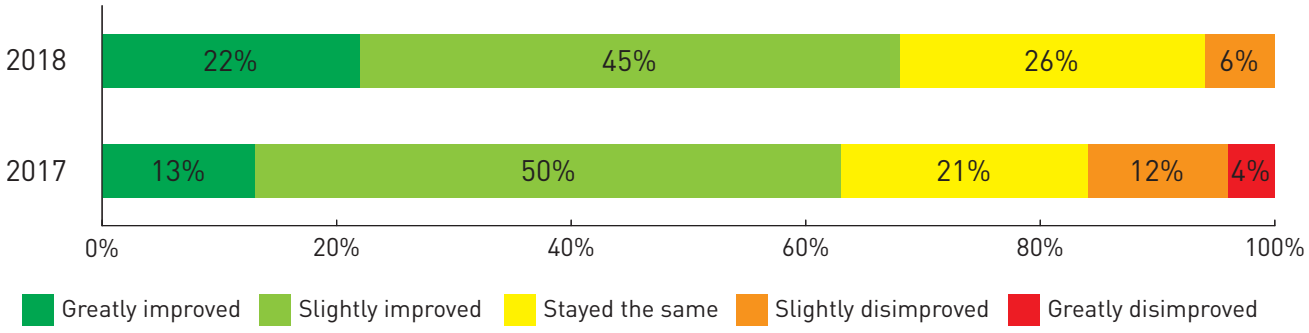
Ireland's economy grew at a strong pace through 2018. According to the Central Statistics Office (CSO), there was an annual increase in employment of 3.0% or 66,700 in the year to the third quarter of 2018, bringing total employment to 2,273,200. As introduced in the Engineering 2018 report and elaborated in the following pages, the engineering sector has been growing even more rapidly. This section of the report presents data on changes in engineering employment in the past year and prospects for the remainder of 2019.

2.1 Looking back on 2018

In October 2018, Engineers Ireland engaged with engineering employers to learn about employment conditions, financial performance and recruitment trends. We surveyed a representative sample of engineering organisations across consulting engineering, construction, manufacturing and other industries such as the public sector and utilities. The respondents included 108 engineering organisations with a total of 36,778 employees in the Republic of Ireland. Take a look at Appendix 1 for the survey method and sample.

Engineering employers in Ireland had a good year in 2018. 77% of them told us that their financial position greatly improved or slightly improved during those 12 months when compared to 2017. Meanwhile, just 6% felt that their position has disimproved (Figure 1). These results are a further improvement on the performance of engineering firms in 2017. Meanwhile, four out of five engineering employers recruited engineers last year.

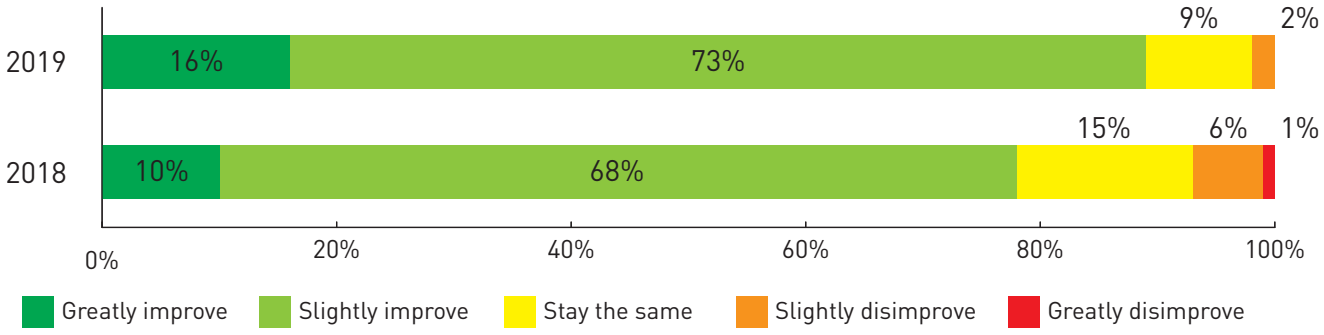
Figure 1 Reported change in financial position



2.2 Outlook for 2019

Turning to the year ahead, 89% engineering employers told us that they expect their financial position to greatly improve or slightly improve in 2019 (Figure 2). This represents an 11-point increase on employers' expectations at this time last year.

Figure 2 Expected change in financial position



The engineering employers also told us about their recruitment plans for 2019. By extrapolating these results to the full engineering labour force (weighting by industry), we estimated recruitment trends for the broader engineering sector (see Appendix 1 for method). This research revealed the enormous demand for engineers right across the economy. More than 6,000 job openings for engineers will be created in 2019 (Table 1).

Table 1 Demand for engineers in 2019 by industry and discipline

	Construction	Consultancy	Manufacturing	Other	All industries
Chemical & Process	14	15	81	42	152
Civil & Building	166	1004	121	770	2,060
Electrical & Electronic	429	163	320	714	1,626
Mechanical & Manufacturing	465	113	346	252	1,175
Other/General	0	532	89	378	999
All disciplines	**1,074**	**1,828**	**956**	**2,156**	**6,014**

6,014 Demand for engineering recruits in 2019

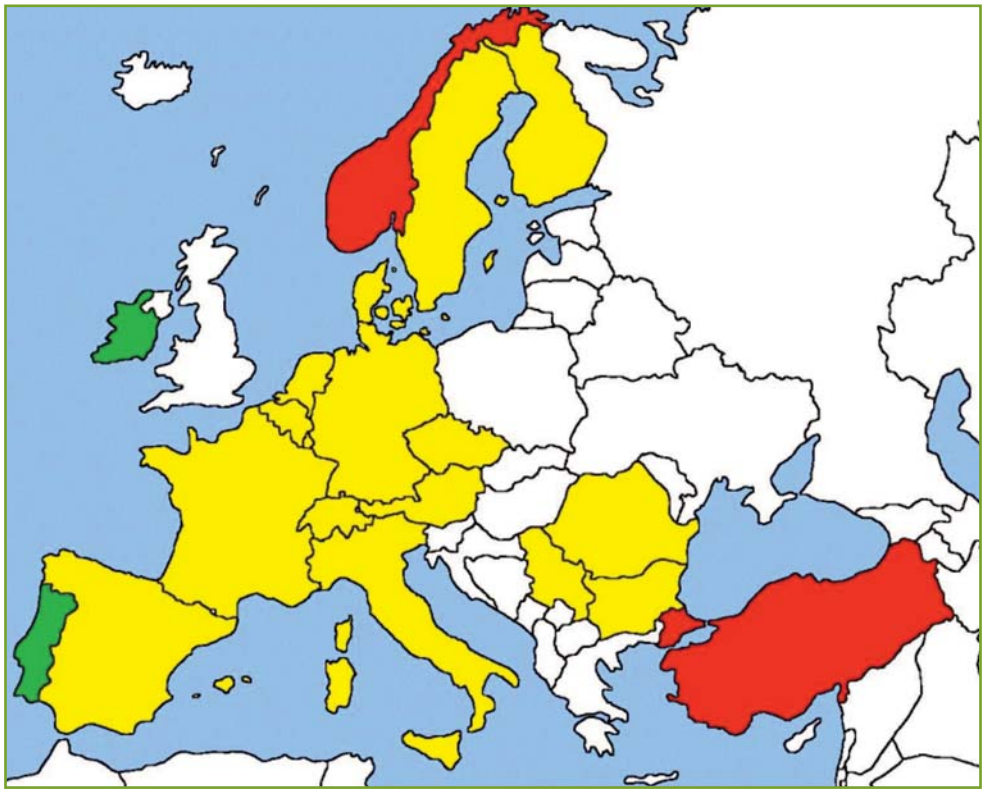
Demand is strongest in consulting engineering companies (particularly for more experienced engineers – Table 2). The European Federation of Engineering Consultancy Associations (EFCA) expects Irish consulting engineering to be one of the only markets with increasing profitability in 2019 (Figure 3). Large numbers of engineers are also required in construction, manufacturing and in other areas such as the public sector and utilities.

Table 2 Demand for engineers in 2019 by experience and discipline

	5+ years	3-5 years	0-2 years	All
Construction	310	411	353	1,074
Consultancy	744	604	480	1,828
Manufacturing	332	242	383	956
Other	1,232	504	420	2,156
All industries	**2,617**	**1,760**	**1,636**	**6,014**

Civil & Building Engineers are among the most in demand with 59% of organisations surveyed looking to hire these engineers in 2019. Meanwhile Mechanical & Manufacturing Engineers and Electrical & Electronic Engineers are sought by 39% and 35% engineering companies, respectively.

Figure 3 Expected change in profitability in consulting engineering in 2019 (EFCA Barometer)



2.3 Skills shortages indicators

Published in November, the National Skills Bulletin 2018 is a report by the SOLAS on behalf of the National Skills Council. The Bulletin presents a set of skills shortage indicators, which informs Government policy in areas such as employment and education. Its method is based on a comparison of estimated demand and supply for 100 occupation categories, which receive a shortage indicator of green, amber or red – see below for the description of each colour.

Shortage indicator	Description
	There are no shortages
	There is no overall current shortage, but some issues (e.g. geographical mobility, high turnover), or potential future shortages, have been identified.
	There is an insufficient number of individuals who had the required level of educational attainment, skills set and/or experience to meet the required labour market demand and/or where there is an insufficient number of individuals available to take up employment opportunities in a particular occupation.

The Bulletin identifies shortages in almost all engineering occupations, indicated by red dots in Table 3. The Bulletin specifically highlights shortages in the following engineering occupations: electrical, chemical, automation, validation, mechanical, process, quality control, design, and civil. There are also shortages in related fields such as technicians and construction project managers.

The results and commentary presented in the Bulletin echo Engineers Ireland's research and engagements (see Section 3 of this report and the Engineering 2018 report), which have continuously pointed to skills shortages across the sector in recent years. Employment has been growing strongly (annualised growth rate of over 7%) and engineering organisations and recruitment agencies are finding it increasingly difficult to fill vacancies.

As outlined in Section 4 of this report, the output from the Irish education system is insufficient to meet the level of demand for engineers. Furthermore, there have been relatively few employment permits issued for non-EEA nationals to work in the sector. This is particularly the case for civil engineering which is not included on the Highly Skilled Eligible Occupations List (see Conclusion).

Table 3 Skills shortages indicators as presented in the National Skills Bulletin 2018

Occupation	Commentary	Number employed	Growth rate[1]	Difficult to fill[2]	Permits issued[3]	Shortage indicator
Civil engineers & construction project managers Includes - Civil engineers - Construction project managers	Output from the education and training system is not expected to be enough to meet growing demand. Shortages are only beginning to emerge and are small in numbers, although the reduced supply indicates that these shortages could be exacerbated in future years.	11,000	6.3%	✓	15	●
Production, design & QC engineers Includes - Process - Quality control - Design	Employers are frequently citing these occupations as difficult to fill although the demand is likely to be small in number given the size of the employment stock. Demand is mostly for roles requiring sector specific experience (e.g. medium-high, high-tech and food/beverage manufacturing).	13,000	8.4%	✓	239	●
Other engineering professionals Includes - Electrical - Chemical - Automation - Validation - Mechanical	Employment growth in this occupational group, which includes mechanical, electrical and electronic engineers, was above average. Employers are frequently citing these occupations as difficult to fill although the demand is likely to be small in number given the size of the employment stock. While the supply from the education system appears to be growing, demand is mostly for roles requiring sector-specific experience (e.g. medium-high, high-tech and food/beverage manufacturing).	14,200	7.2%	✓	207	●

[1]Employment growth: Annualised rate of employment growth for the period 2012-2017.

[2]Difficult to fill: Results of the SLMRU (SOLAS) Recruitment Agency Survey conducted in April 2018. The occupations with mentions of difficult-to-fill vacancies reported by recruitment agencies are indicated by a tick.

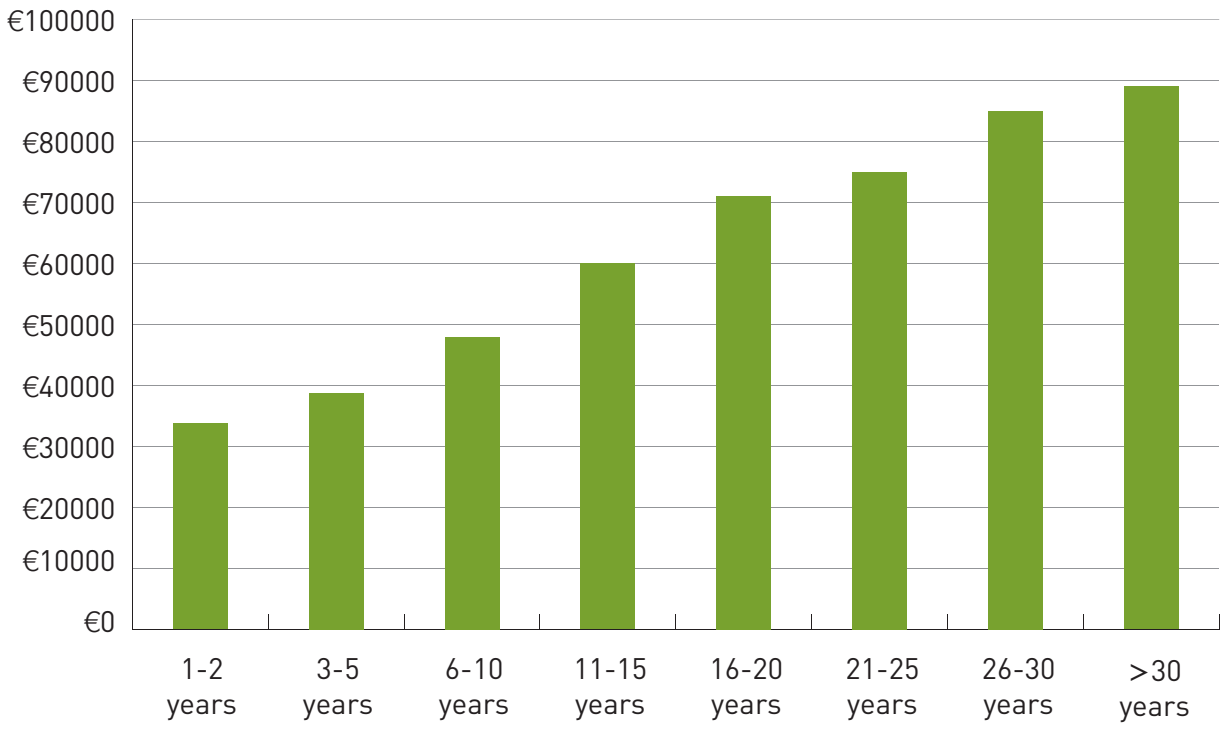
[3]Employment permits: Issued to non-EEA nationals in 2017. This is an indicator of the demand for skills that could not be met from domestic or EEA sources.

2.4. Salaries

In January 2019, we asked the Engineers Ireland membership about the levels of remuneration and benefits in the profession. 1,724 engineers responded and the survey method and characteristics of the sample are provided in Appendix 1. The last Engineers Ireland Salary Survey was conducted using a similar approach during the same period in 2018. The data which follow are median salaries.

NOTE The median is the number in the middle when a list of numbers is sorted from lowest to highest. Half of all engineers earn more than the median salary; half of all engineers earn less than the median salary.

Figure 4 Median salary by years of experience



A graduate engineer can expect to earn €33,750 in 1-2 years after graduation (Table 4). This salary will increase steadily with experience (Figure 4) and engineers with 11-15 years' experience today earn €60,000. The majority of engineers with more than 30 years of experience currently earn more than €89,000. Since 2014, salaries have been increasing in the profession, particularly for younger engineers. Today's graduate engineer can expect to start on a salary that is more than €5,000 higher (+21%) than her/his counterpart in 2014.

€33,750 Median salary, Engineer with 1-2 years' experience

Table 4 Median salary by years of experience and change since 2014

Experience	2019	1-year change	5-year change
1-2 years	€33,750	+9%	+21%
3-5 years	€38,750	+5%	+17%
6-10 years	€48,000	+5%	+12%
11-15 years	€60,000	n/c	+3%
16-20 years	€71,000	+1%	+13%
21-25 years	€75,000	-3%	+3%
26-30 years	€85,000	+3%	+9%
>30 years	€89,000	-4%	+10%

Engineers Ireland awards professional titles such as 'Chartered Engineer' and 'Fellow', recognising the career progression, ethical standards and achievements of our members. The value of these professional titles is recognised through increased remuneration. A Chartered Engineer can expect to earn €5,000 per year more than an untitled engineer with the same number of years of experience (Table 5). It takes more than 20 years of experience before this salary gap closes. At this point, Chartered Engineers who become Fellows of Engineers Ireland can expect to earn an additional €15,000-€20,000 per year.

Table 5 Median salary by years of experience and professional title

Experience	Fellow (FIEI)	Chartered Engineer (CEng)	Member (MIEI)
1-2 years	-	-	€33,200
3-5 years	-	-	€38,000
6-10 years	-	€50,000	€45,000
11-15 years	-	€61,500	€56,000
16-20 years	-	€73,000	€68,500
21-25 years	€93,000	€75,000	€75,000
26-30 years	€107,500	€86,000	€79,000
>30 years	€106,000	€86,250	€95,000

NOTE

The Engineers Ireland Salary Survey 2019 report is an exclusive Engineers Ireland member benefit, available to download from the members' area of www.engineersireland.ie. This report includes detailed analysis of salaries and other benefits (pensions, bonuses etc.) according to engineering discipline, sector, position and much more.

€50,000 Median salary, Chartered Engineer with 6-10 years' experience


VIVE

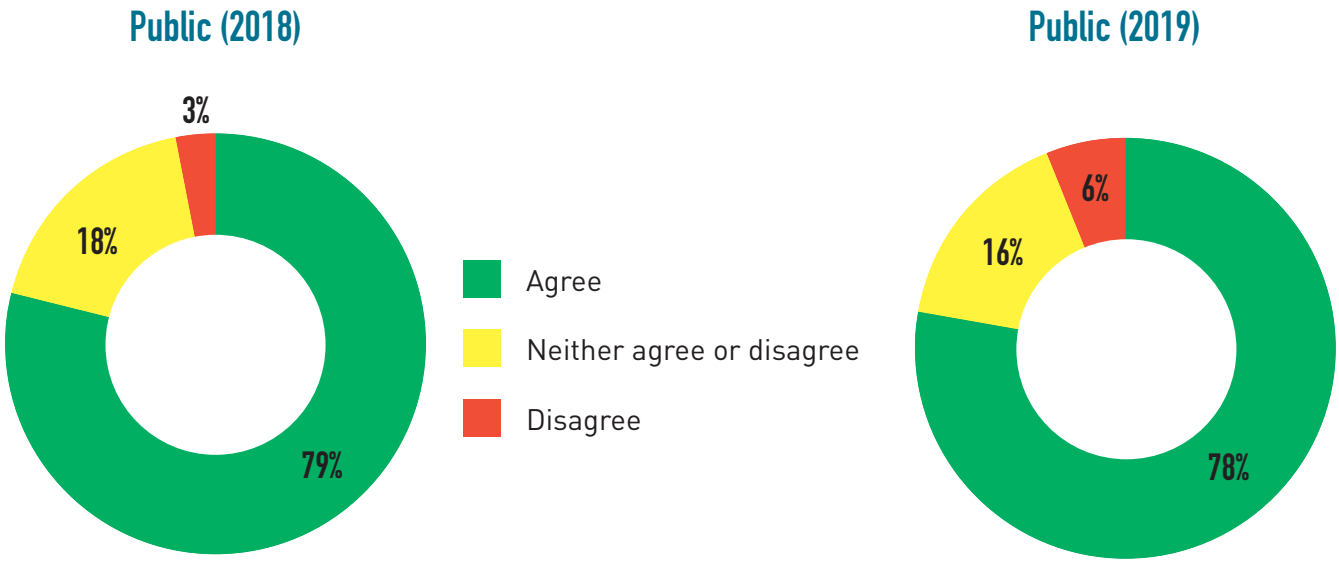
Engineering perspectives

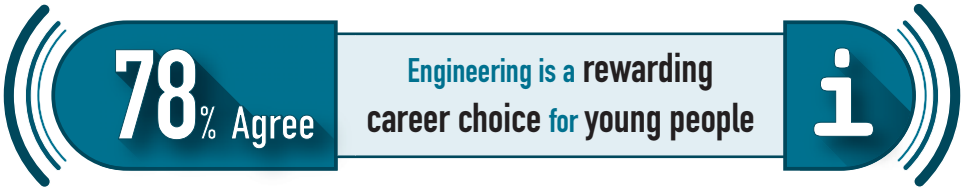
For the final of the three Engineering 2019 surveys, we commissioned Behaviour & Attitudes to undertake a face-to-face poll with 1,000 members of the public and representative of the Irish population aged 16 years old and over. The poll used the same methodology as in 2018, which enables direct comparisons (see Appendix for methodological information). The following section of the report analyses the public's perspectives on aspects of the engineering profession. For some indicators, these perspectives are compared with those of qualified engineers and their employers.

3.1 Engineering as a career

We were interested to learn about the general public's perspectives on engineering as a career. When asked whether engineering is a rewarding career choice for young people, the vast majority (78%) agreed – see Figure 5. This is a marginal (one percentage point) decrease on 2018, which may be explained by slight differences in the poll's sample. There was particularly strong agreement among 25-34 year olds, 81% of whom believe that engineering is a rewarding career choice for young people.

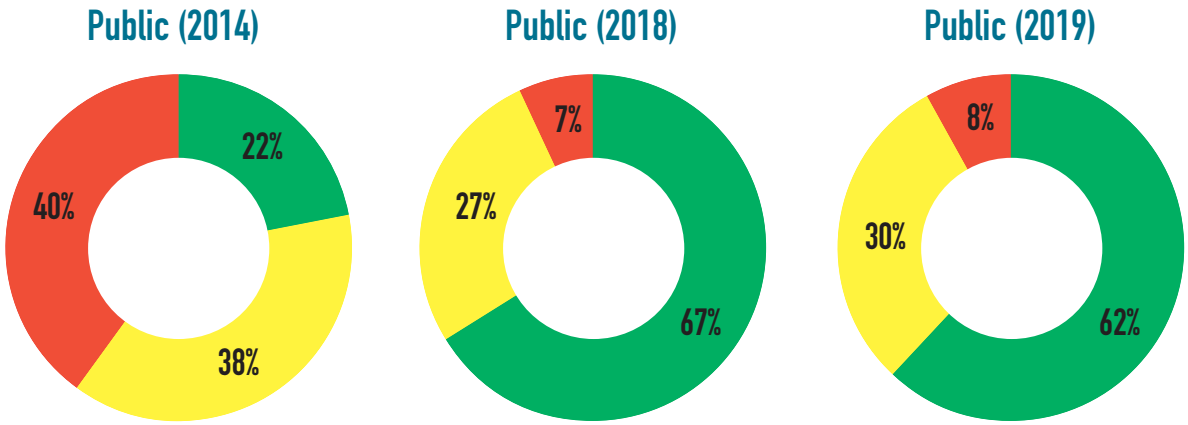
Figure 5 Engineering is a rewarding career choice for young people



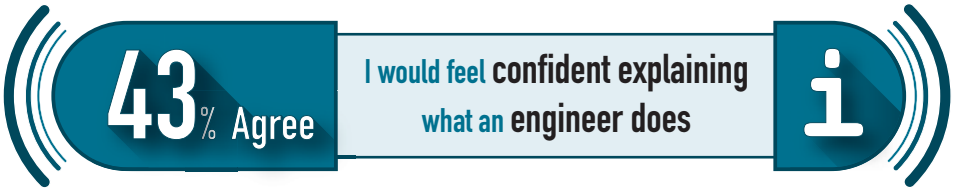


The public also believe that there are plenty of job opportunities in the engineering sector in Ireland (62% agree), shown in Figure 6. This is a remarkable improvement on a similar poll conducted by Engineers Ireland five years ago when only 22% adults thought that there were plenty of job opportunities. This said, there has been a slight decrease in this metric over the past year, from 67% in 2018 to 62% in 2019.

Figure 6 There are plenty of job opportunities in engineering in Ireland



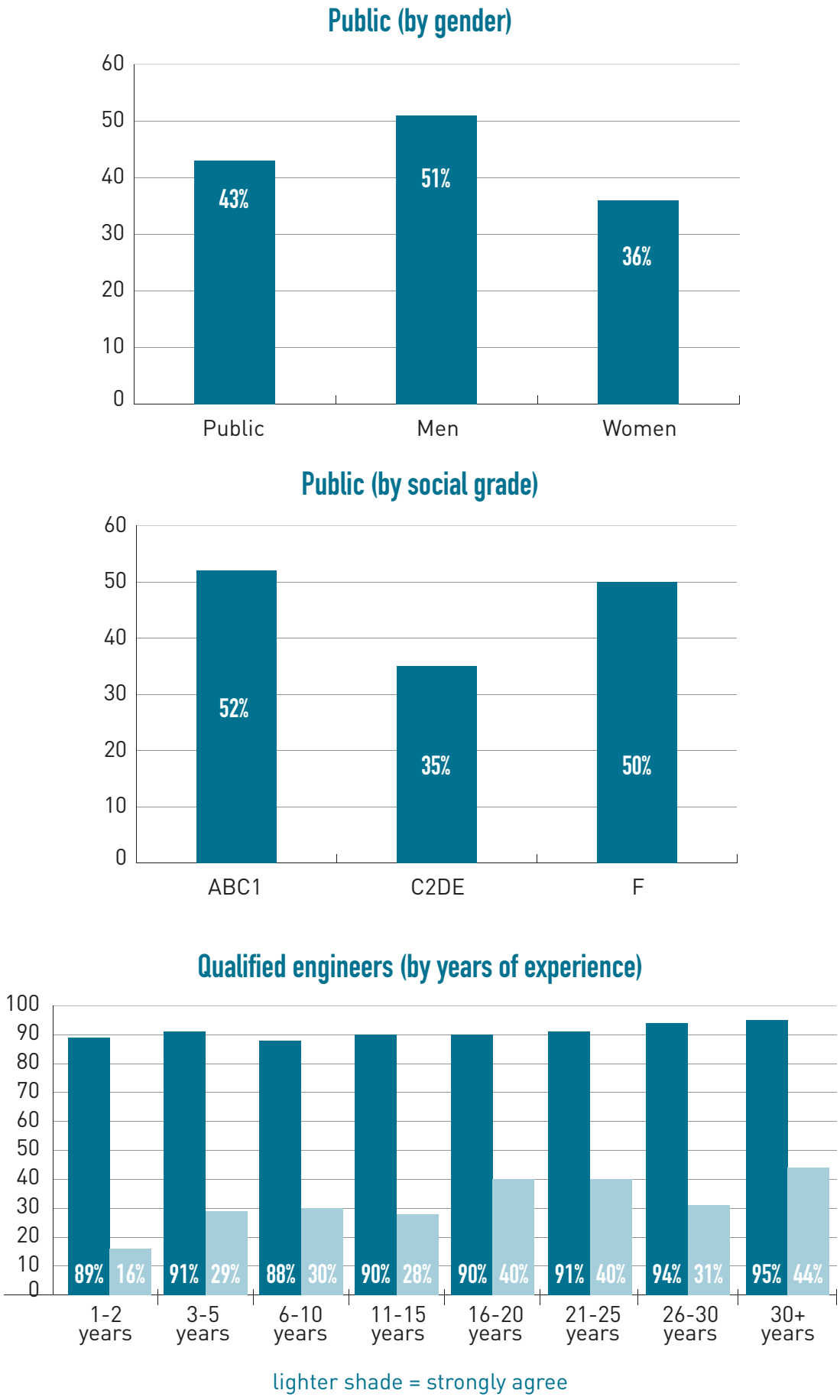
In the poll, members of the public were also asked their level of agreement with the statement 'I would feel confident explaining what an engineer does'. Overall, just 43% of the public feel confident explaining engineering. Interestingly, men are substantially more confident explaining engineering: 51% agreed with the statement, compared to 36% of women.



There was one other area where there was a significant variation in response according to the demographics of respondents – social grade of the occupation of the chief income earner. There is substantially higher confidence explaining engineering among those grouped as ABC1 (52%) and Farmers (50%) than those grouped as C2DE (35%).

Examining engineers' ability to explain their profession, it is unsurprising that more than 90% feel confident explaining: 57% agreed and 33.5% strongly agreed. It is interesting to note that the proportion who strongly agreed broadly increases with years of experience: 16% of newly qualified engineers strongly agreed compared to 44% of the most experienced engineers.

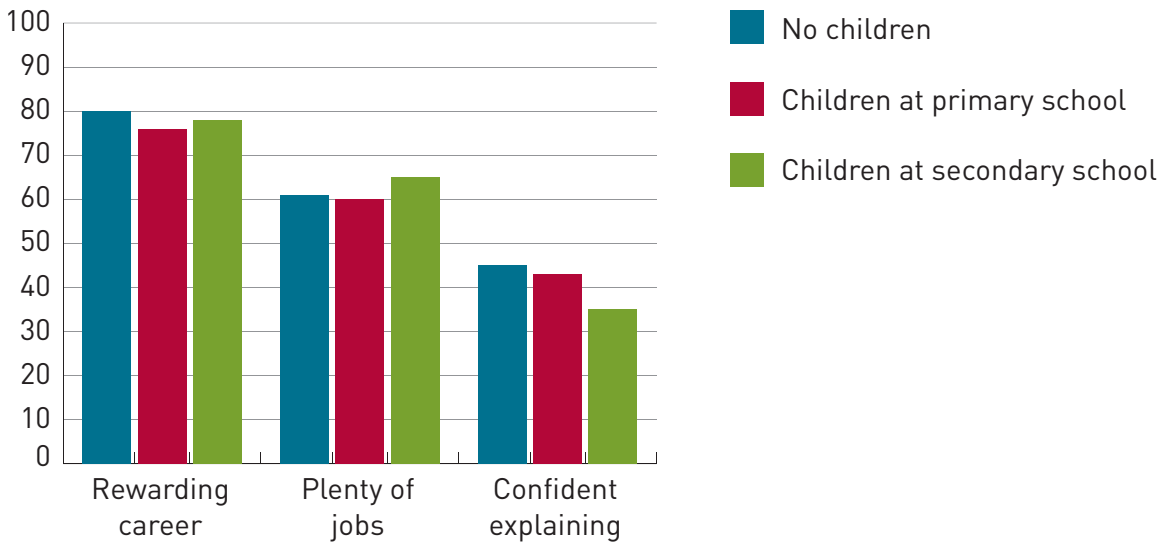
Figure 7 Confidence explaining what an engineer does



Research by Science Foundation Ireland, Accenture, Microsoft and many others has found that parents have a hugely important role in encouraging their children to study STEM subjects. We are therefore very interested in understanding and working with parents' attitudes to engineering. Segregating the results of the public poll by lifestage, it was possible to compare the responses of three cohorts (Table 6): single people with no children; people with children in primary school; and people with children in secondary school.

Table 6 Views on engineering as a career (% agreeing with each statement)

	No children	Children in primary school	Children in secondary school
Engineering is a rewarding career choice for young people	80%	76%	78%
There are plenty of job opportunities in the engineering sector in Ireland	61%	60%	65%
I would feel confident explaining what an engineer does	45%	43%	35%

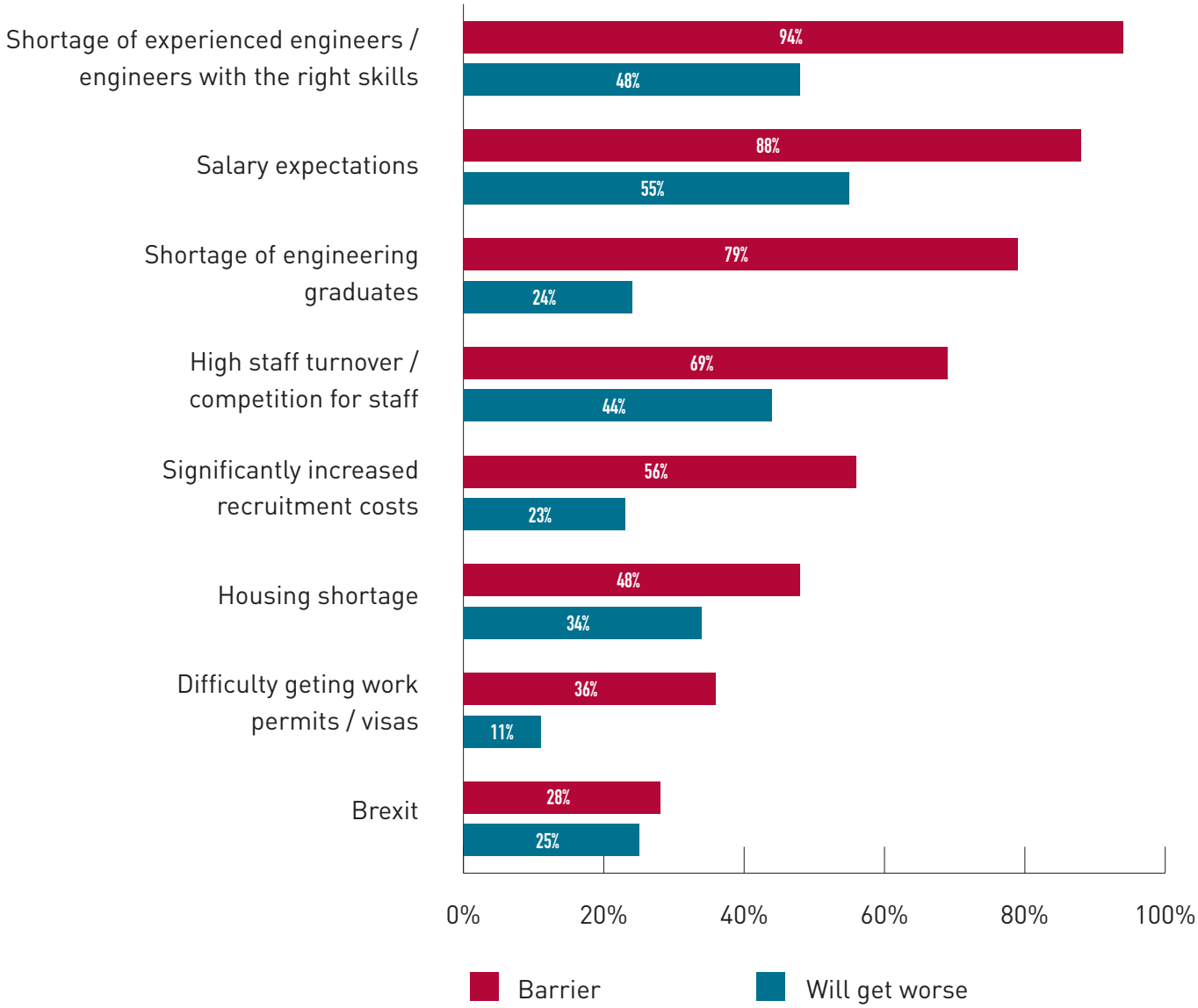


It is very positive that large majorities in all three cohorts believe that engineering is a rewarding career for young people. Similarly, most of these members of the public agree that there are plenty of job opportunities in engineering, almost two-thirds (65%) of parents of secondary school children support this statement. However, it is worrying that only 35% of these same parents feel confident explaining what an engineer does for a living. We return to this issue in the Conclusion of the report.

3.2 Recruitment and skills

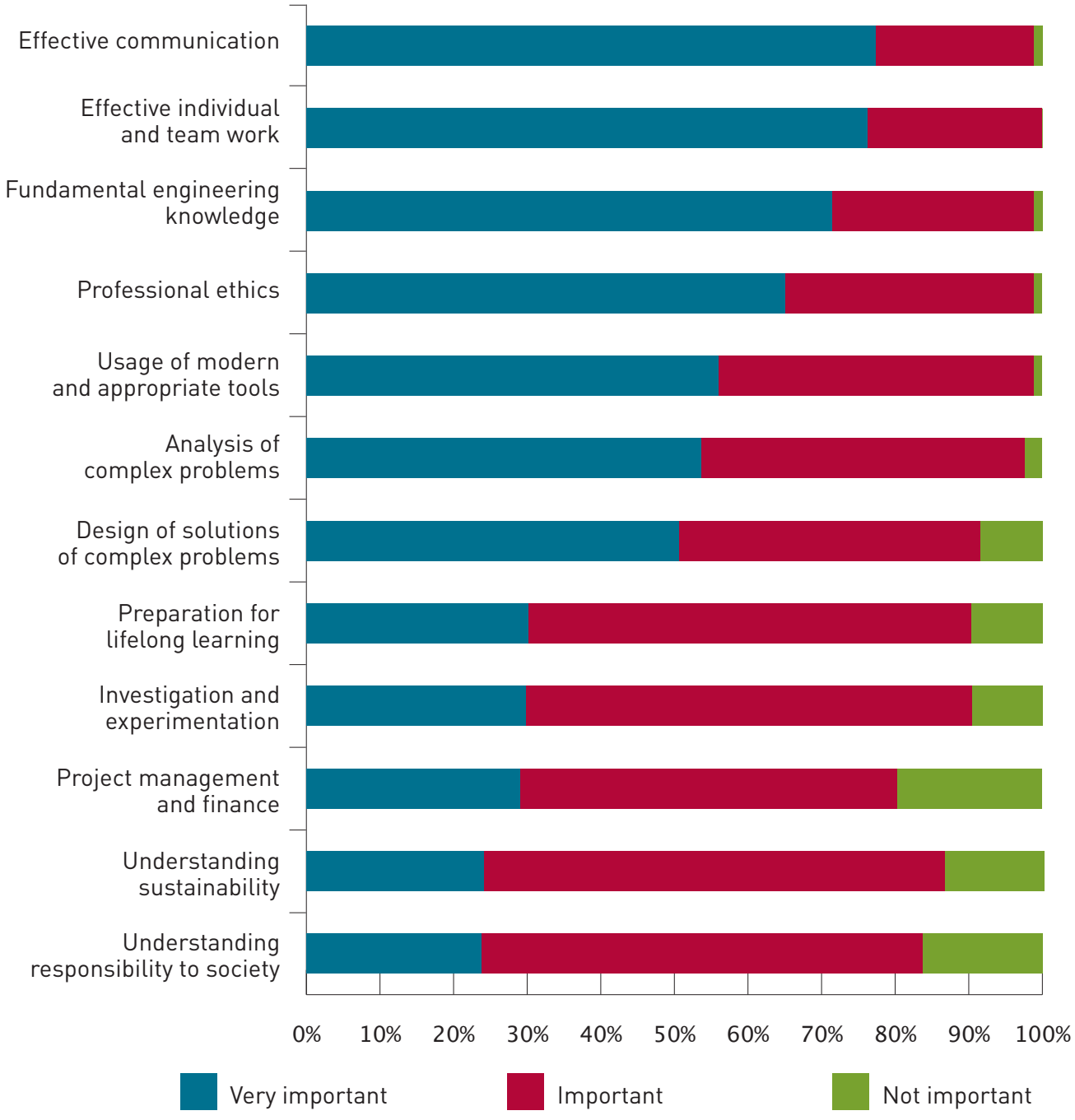
In our survey of engineering employers, we asked about barriers to recruitment in 2018 and 2019. The employers' biggest barrier to growth is a shortage of experienced engineers / engineers with the right skills. 94% of them told us that this is a barrier and almost half (48%) expect this situation to get worse in the next year (Figure 8). This shortage is related to the shortage of engineering graduates and the competition for staff, which were ranked as the third and fourth largest barriers.

Figure 8 Employers' barriers to recruitment



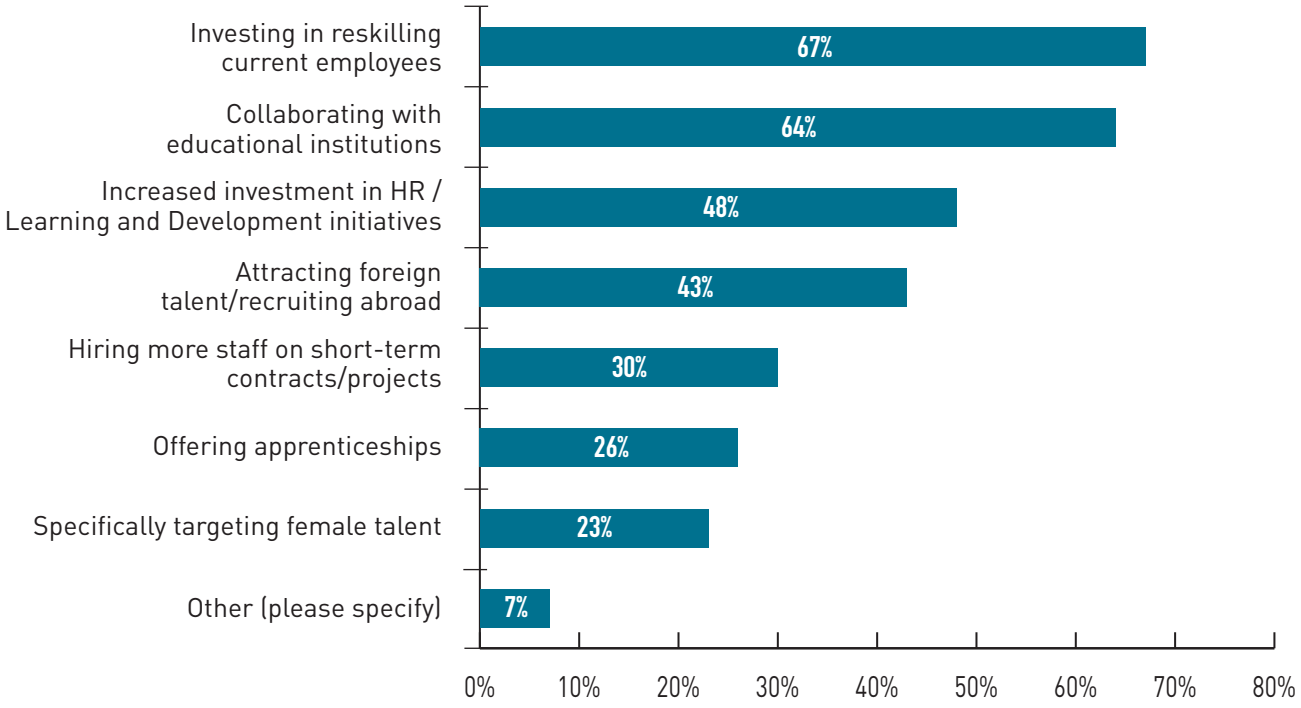
When we asked the employers what kind of skills they considered important, they responded that skills such as communication and teamwork are just as important as – if not more important than – engineering knowledge and methods. Despite using a different list of skills (based on the International Engineering Alliance's graduate attributes) this year, this is the second year in a row that communication skills were ranked the most important by engineering employers (77% said these skills were 'very important', while 21% responded 'important'). Other 'very important' skills are: effective individual and team work (76% employers), fundamental engineering knowledge (71%) and professional ethics (65%).

Figure 9 Important engineering graduate attributes



To ensure they have the skills and expertise to undertake future projects, engineering organisations have been investing in upskilling/reskilling current employees (66%) and collaborating with education institutions (64%) – see Figure 10. However, comparatively few have been offering apprenticeships (26%) or specifically targeting female talent (23%). While it is not possible to directly compare these results to the previous year (due to a change in method), the ranking of the initiatives is the same in both sets of results.

Figure 10 Initiatives taken by employers to overcome skills shortages



In an open-ended question, we asked the engineering employers what they have found has worked in attracting the right engineering talent. Of a wide variety, some typical responses included:

- *"The most important single element to attract people to the company remains salary."*
- *"Offering benefits and flexible working hours / work from home options."*
- *"Providing opportunities for advancement within the organisation with clear defined routes for progression."*
- *"We have visited colleges to show them details of our graduate programme."*
- *"Have a focus on existential issues such as climate change and renewable energy."*

3.3 Public health and safety

In the Engineering 2018 report, we explored public trust in a variety of professions using an established methodology (which is also used by the Medical Council of Ireland). We were glad to discover that there are exceptionally high levels of trust in the engineering profession: 91% adults trust engineers to tell the truth. Of the 10 professions listed, only doctors were more trusted. In that same poll, 91% adults said that they regard engineers to be highly competent – that they are able to apply expertise in their daily work.

This year, we sought to better understand public perceptions of risk of harm and the role of the various professions. In the first question of the poll (to avoid inducing bias), we asked:
"Some work can cause serious harm to the public if it isn't done correctly. In which of the following areas of work is there a serious risk of harm?"
The respondents were presented with a randomised list of 10 areas of work, based on the list of professions used in 2018. The results are shown on the next page.

85% of adults believe that engineering work poses a serious risk of harm to the public if it isn't done correctly. This was followed by medicine (81%) and policing (76%). It is in this context that public confidence in the competence of engineers – and indeed in other professions such as doctors – should be seen. As a follow-up question, the poll asked whether engineers are essential to reduce risks to public health and safety. 80% of the public agreed, while only 5% disagreed.

Figure 11 Engineers are essential to reduce risks to public health and safety

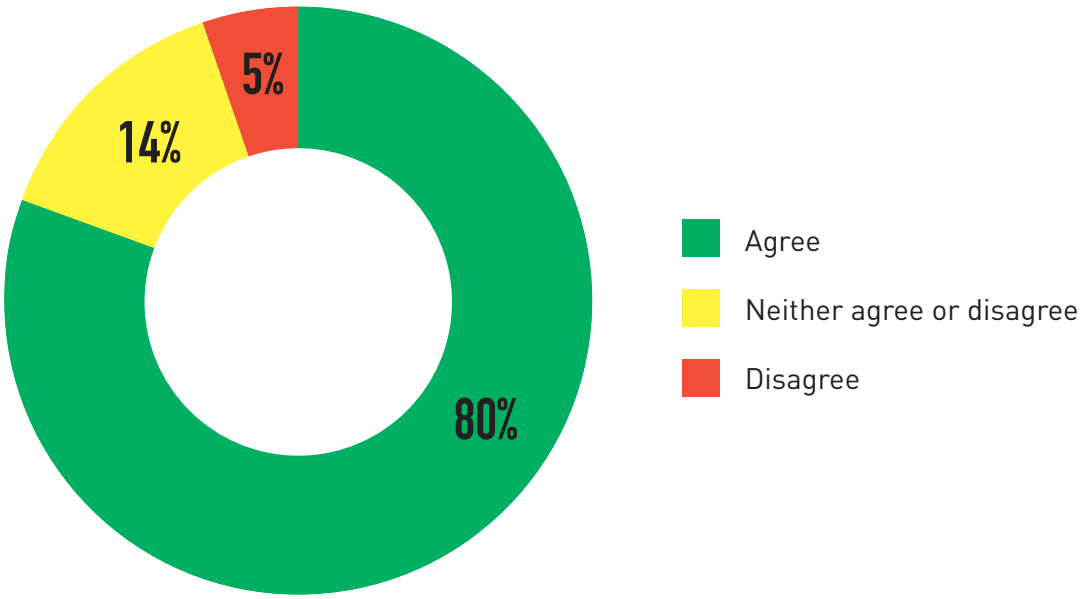
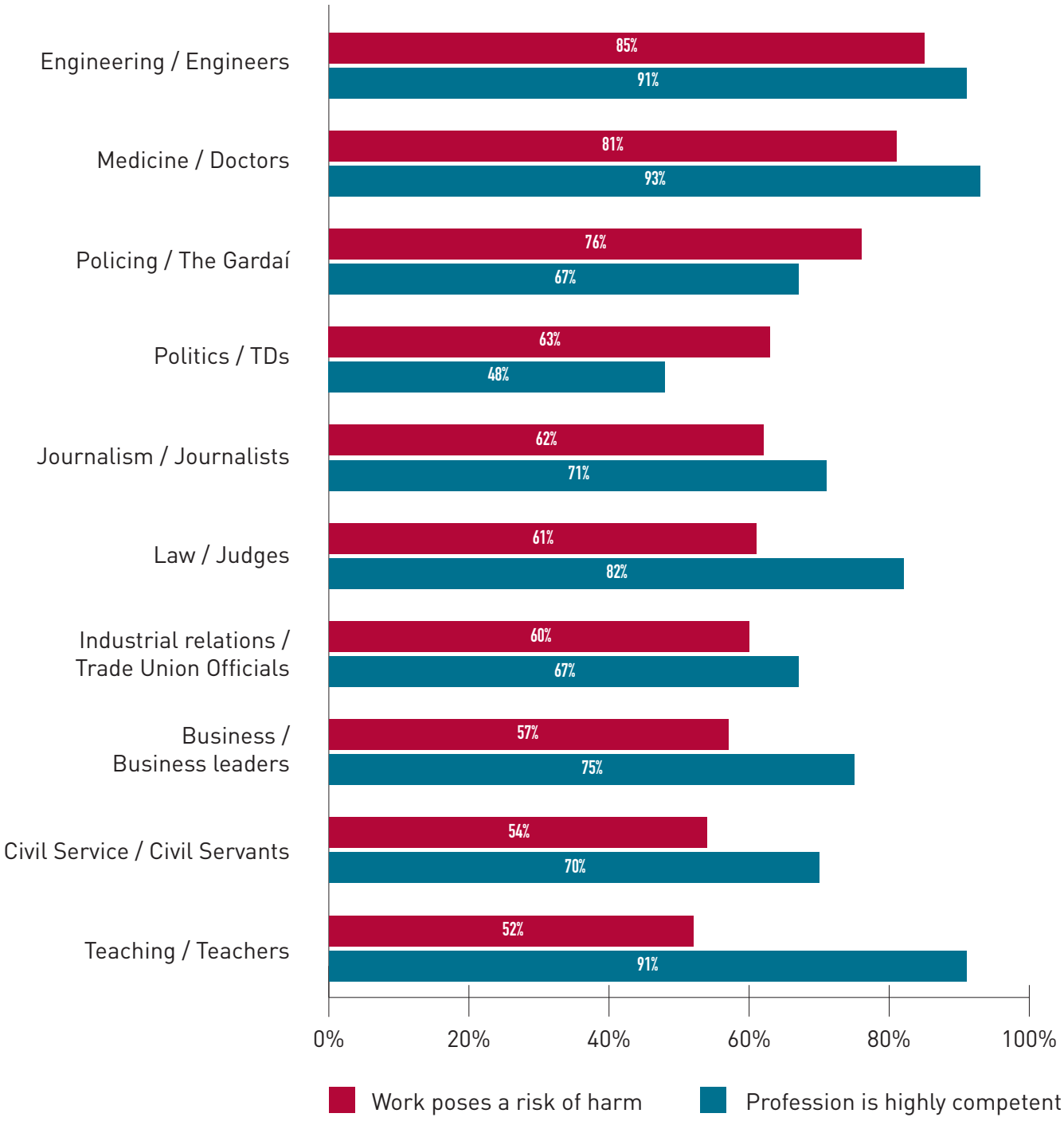


Figure 12 Perceived risk of harm in various areas of work (compared to perceptions of competence in the profession)

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Engineering education

4.1. Junior Certificate

Engineers Ireland is a leading advocate for STEM education, inspiring curiosity, exploration, creativity and problem-solving in children from an early age. For the purposes of this report, our analysis of engineering education begins at the Junior Certificate level. Data on the number of students sitting exams in each Junior Certificate subject are provided by the State Examinations Commission (SEC). In the past five years, the total number of STEM sittings at higher level has increased by 11% (Table 7), while the overall increase in Junior Certificate students was 4.6%. There has been particularly strong growth in the number of students taking higher level mathematics, an increase of almost 5,000 students since 2013.

Table 7 Number of students sitting higher level STEM subjects for the Junior Certificate

Subject	2013	2014	2015	2016	2017	2018	Year-on-year	5 year trend
Science	42,423	42,821	42,658	43,898	45,708	46,423	+2%	+9%
Mathematics	30,500	32,041	32,535	32,830	34,822	35,443	+2%	+16%
Material Technology	13,280	13,487	13,271	13,636	14,142	14,634	+3%	+10%
Technical Graphics	9,207	8,953	8,655	8,684	8,912	9,447	+6%	+3%
Metalwork	6,300	6,373	6,409	6,257	6,229	6,447	+3%	+2%
Technology	2,589	2,830	2,852	3,154	3,163	3,573	+13%	+38%
Total STEM sittings	**104,299**	**106,505**	**106,380**	**108,459**	**112,976**	**115,967**	**+3%**	**+11%**

Table 8 Number of students sitting ordinary level STEM subjects for the Junior Certificate

Subject	2013	2014	2015	2016	2017	2018	Year-on-year	5 year trend
Mathematics	24,687	24,047	22,856	23,781	23,570	23,833	+1%	-3%
Science	11,488	11,936	11,632	11,573	11,499	11,785	+2%	+3%
Technical Graphics	3,357	3,396	3,046	3,247	3,500	3,599	+3%	+7%
Material Technology	2,883	2,977	2,874	2,745	2,941	2,833	-4%	-2%
Metalwork	1,543	1,507	1,575	1,630	1,590	1,588	-0.1%	+3%
Technology	368	393	406	422	413	497	+20%	+35%
Total STEM sittings	**44,326**	**44,256**	**42,389**	**43,398**	**43,513**	**44,135**	**+1%**	**-0.4%**

4.2 Leaving Certificate

Turning to the Leaving Certificate, data again obtained from the SEC, show that the number of students sitting exams in STEM subjects held steady while the overall number of students sitting the Leaving Certificate dropped by 2.4%. This drop means that year-on-year results are mixed, though the five-year trend is very positive (Table 9).

Table 9 Number of students sitting higher level STEM subjects for the Leaving Certificate

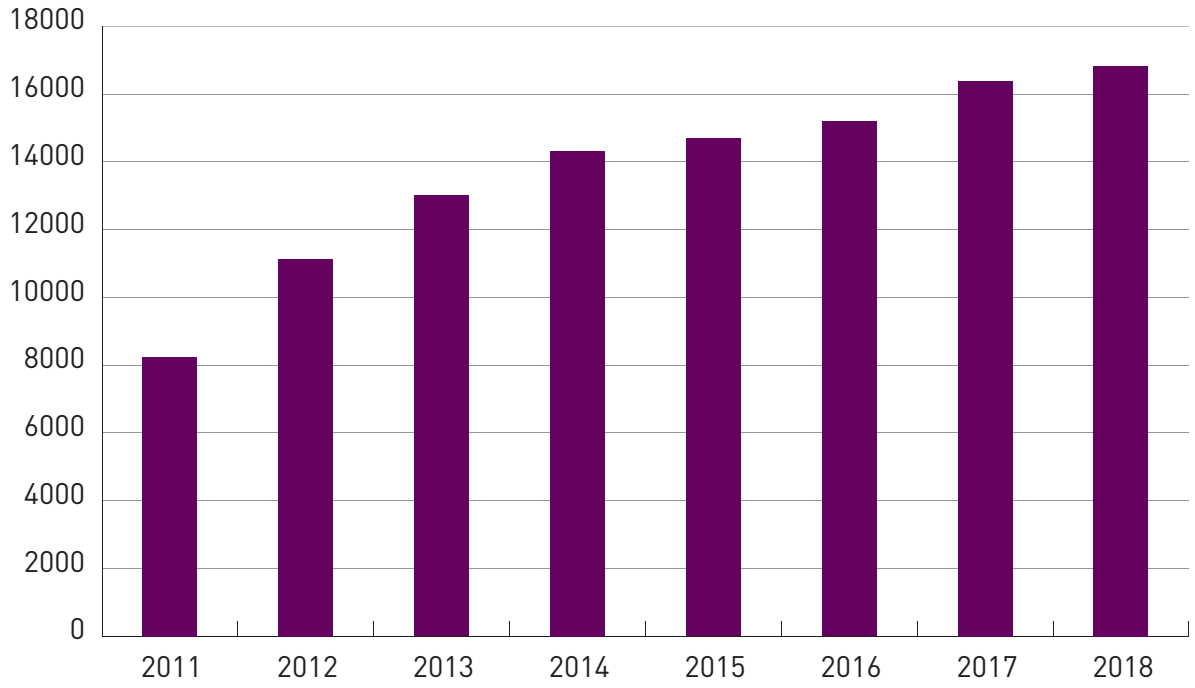
Subject	2013	2014	2015	2016	2017	2018	Year-on-year	5 year trend
Biology	23,433	24,442	25,595	25,211	26,684	26,543	-1%	+13%
Mathematics	13,014	14,326	14,691	15,198	16,395	16,837	+3%	+29%
Chemistry	6,757	7,226	7,533	7,658	8,162	7,943	-3%	+18%
Construction Studies	6,572	6,847	6,877	7,087	7,451	7,105	-5%	+8%
Agricultural Science	5,951	6,329	6,067	6,269	6,376	6,543	+3%	+10%
Physics	4,832	5,399	5,764	6,003	6,271	6,258	+0%	+30%
Engineering*	3,742	4,172	4,408	4,489	4,586	4,668	+2%	+25%
Design & Communication	4,017	4,097	4,192	4,350	4,445	4,480	+1%	+12%
Applied Mathematics	1,470	1,569	1,729	1,917	1,869	1,826	-2%	+24%
Technology	944	983	1,168	1,244	1,367	1,430	+5%	+51%
Physics & Chemistry	330	361	437	439	481	415	-14%	+26%
Total STEM sittings	**71,062**	**75,751**	**78,461**	**79,865**	**84,087**	**84,048**	**n/c**	**+18%**

84,048 Leaving Certificate higher level STEM sittings

NOTE The Leaving Certificate subject 'engineering' is the study of a range of mechanical engineering materials, processes and technological applications. It is not a requirement for entry to engineering at third level, which is much broader in scope.

The take-up of higher level maths continues to go from strength to strength; the number of students taking this paper has doubled since 2011 (Figure 13). Today, more than one-third of mathematics students take the subject at higher level, up from 18% in 2011.

Figure 13 Number of students sitting higher level mathematics for the Leaving Certificate



As the number of students studying STEM subjects at higher level over the past two years increased, there were corresponding decreases at ordinary level (Table 10). Between 2016 and 2018, 5,000 more students sat higher level STEM subjects while 5,000 fewer students sat these subjects at ordinary level. This may be a result of the new grading system introduced in 2017, whereby a student achieving a result of 30-39% (H7 grade, previously known as an 'E' grade) at higher level is awarded CAO points.

Table 10 Number of students sitting ordinary level STEM subjects for the Leaving Certificate

Subject	2013	2014	2015	2016	2017	2018	Year-on-year	5 year trend
Mathematics	32,165	32,428	33,266	32,549	32,334	31,336	-3%	-3%
Biology	8,064	8,514	8,269	8,890	7,608	7,006	-8%	-13%
Physics	1,616	1,778	1,744	1,750	1,314	1,277	-3%	-21%
Chemistry	1,399	1,378	1,405	1,431	1,306	1,224	-6%	-13%
Construction Studies	1,541	1,562	1,392	1,466	1,299	1,143	-12%	-26%
Agricultural Science	1,463	1,597	1,605	1,624	1,284	1,237	-4%	-15%
Design & Communication	1,334	1,257	1,170	1,173	1,130	913	-19%	-32%
Engineering	1,139	1,031	968	890	689	586	-15%	-49%
Technology	130	119	160	171	160	104	-35%	-20%
Physics & Chemistry	993	105	115	140	110	103	-6%	+11%
Applied Mathematics	129	137	190	172	100	128	+28%	-1%
Total STEM sittings	**49,073**	**49,906**	**50,284**	**50,256**	**47,334**	**45,057**	**-5%**	**-8%**

4.3 Higher education

A wide range of engineering-related courses are offered at third level in universities and institutes of technology. Engineers Ireland accredits over 100 engineering programmes, subjecting each to a rigorous process of evaluation. Appendix 2 lists the CAO codes and courses which can lead to an Engineers Ireland accredited qualification, categorised according to eligibility for Engineers Ireland's Professional Titles: Chartered Engineer, Associate Engineer or Engineering Technician.

The Higher Education Authority (HEA) collects statistics on higher education student entry, enrolment and graduation. The HEA uses 20 different codes for statistics on engineering-related courses. Engineers Ireland has developed five broad engineering disciplines to enable our analyses (more information is available in the Engineering 2018 report).

New entrants to higher education

For the 2017/18 academic year, there were 3,884 new entrants to engineering courses, an increase of 2% since 2012, but down 4% in the past year (Table 11). As a proportion of all new entrants to higher education, engineering has remained relatively stable at 9%. The analysis of discipline-specific trends is complicated by the common/general entry route (captured in the 'other/general' category). This said, there has been strong growth in Civil & Building Engineering (48% increase since 2012), albeit from a low base. Meanwhile, the number of entrants to Electrical & Electronic Engineering has fallen by 36%.

Table 11 New entrants to higher education

Broad discipline	2012	2013	2014	2015	2016	2017	Year-on-year	5 year trend
Chemical & Process	95	91	82	128	136	100	-26%	+5%
Civil & Building	582	529	645	800	913	863	-5%	+48%
Mechanical & Manufacturing	831	870	976	1,054	1,075	934	-13%	+12%
Electrical & Electronic	1,162	961	886	822	848	742	-13%	-36%
Other/General	1,142	1,349	1,121	1,184	1,073	1,245	+16%	+9%
Total	**3,812**	**3,800**	**3,710**	**3,988**	**4,045**	**3,884**	**-4%**	**+2%**
Total engineering proportion	9%	9%	9%	9%	9%	9%	n/c	n/c

n/c = no change

Graduates

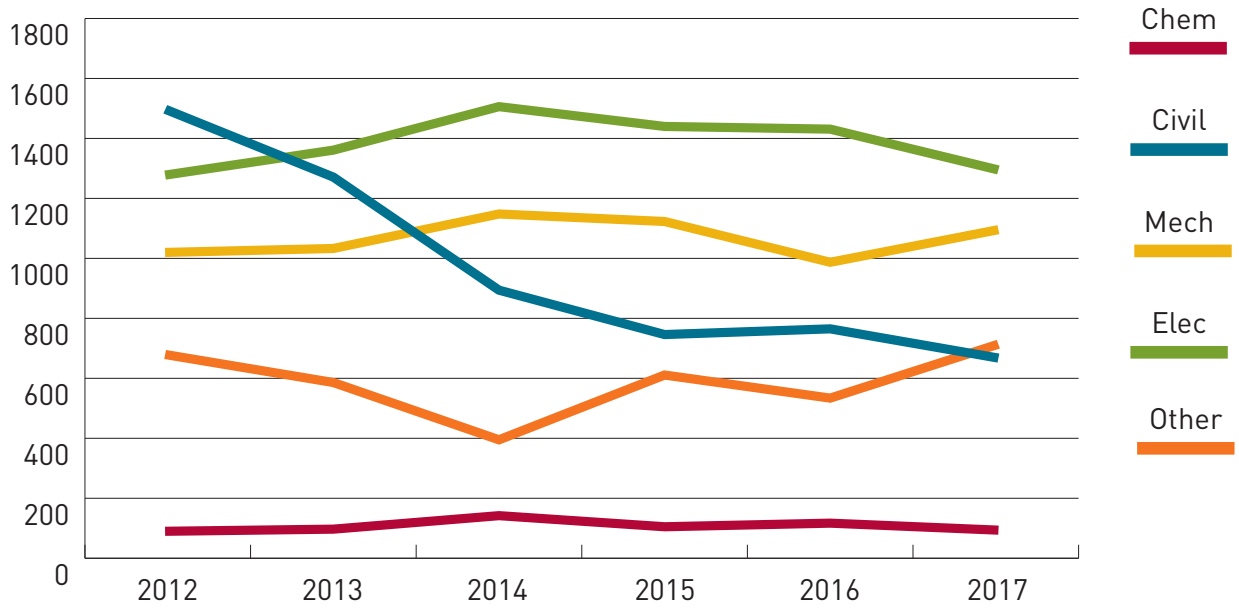
In 2017, there were 3,865 graduates from Level 7 and Level 8 engineering courses (Table 12). This represents a 1% increase since 2016, but a 15% decrease over the past five years. This worrying decline can also be seen in engineering's proportion of all Level 7 and Level 8 graduates which fell from 12% in 2012 to 10% in 2016 and 2017. A particular cause of concern is the 5-year trend in Civil & Building Engineering, graduates of which have dropped from 1,494 in 2012 to 669 in 2017, down 55% in five years.

Table 12 Graduates from Level 7 and Level 8 courses

Broad discipline	2012	2013	2014	2015	2016	2017	Year-on-year	5 year trend
Chemical & Process	90	97	142	105	117	94	-20%	+4%
Civil & Building	1,494	1,271	894	746	765	669	-13%	-55%
Mechanical & Manufacturing	1,020	1,033	1,148	1,123	987	1,094	+11%	+7%
Electrical & Electronic	1,279	1,361	1,506	1,440	1,434	1,297	-10%	+1%
Other/General	678	586	395	611	534	711	+33%	+5%
Total	**4,561**	**4,348**	**4,085**	**4,025**	**3,837**	**3,865**	**+1%**	**-15%**
Total engineering proportion	12%	11%	11%	11%	10%	10%	n/c	-2pp

3,865 Graduates from Level 7 and Level 8 courses

Figure 14 Graduates from Level 7 and Level 8 courses



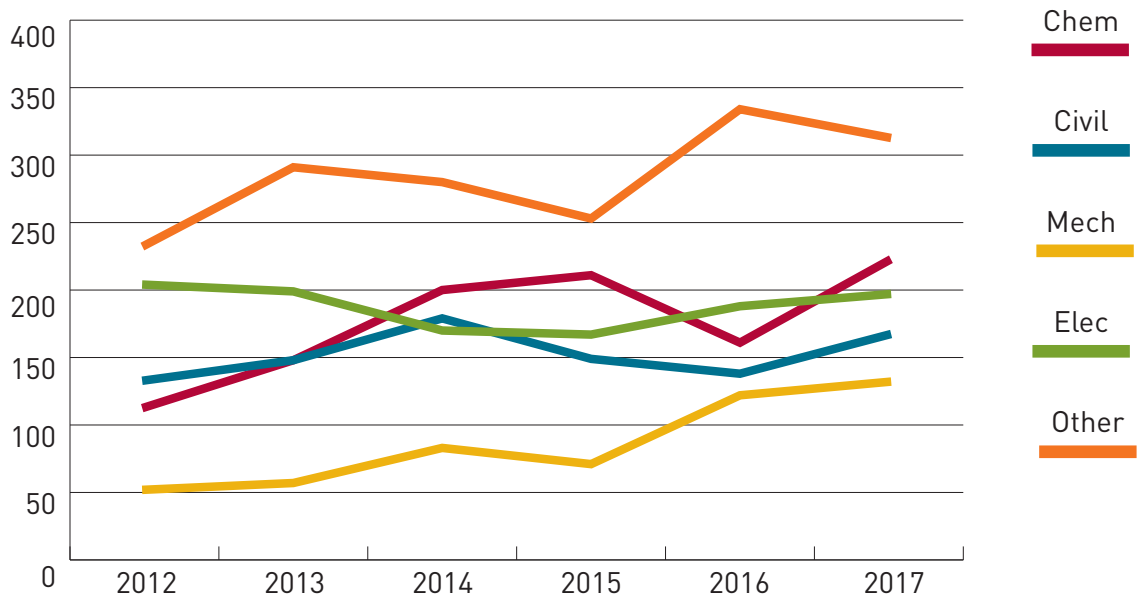
In 2017, there were 1,031 graduates from postgraduates engineering courses (Table 13), almost two-thirds of whom were graduates from taught masters courses (Level 9). There has been a reasonably steady increase in this postgraduate level in recent years, up 9% in the past year and 40% in the past five years. This trend is approximately in line with the national trend, engineering postgraduates accounting for 4-5% of the total.

Table 13 Graduates from Level 9 and Level 10 courses

Broad discipline	2012	2013	2014	2015	2016	2017	Year-on-year	5 year trend
Chemical & Process	113	148	200	211	161	222	+38%	+96%
Civil & Building	133	148	179	149	138	167	+21%	+26%
Mechanical & Manufacturing	52	57	83	71	122	132	+8%	+154%
Electrical & Electronic	204	199	170	167	188	197	+5%	-3%
Other/General	233	291	280	253	334	313	-6%	+34%
Total	**735**	**843**	**912**	**851**	**943**	**1,031**	**+9%**	**+40%**
Total engineering proportion	4%	4%	5%	4%	5%	5%	n/c	+1pp

1,031 Graduates from Level 9 and Level 10 courses

Figure 15 Graduates from Level 9 and Level 10 courses



4.4. Apprenticeships

Data on apprenticeships is provided by the Further Education and Training Authority (SOLAS) and the Department of Education & Skills. New forms of apprenticeships have been developed in the past five years, led by industry consortia with higher education institution (HEI) partners. These apprenticeships are flexible in delivery, including on-the-job learning (approx. 70%) and on-campus learning (approx. 30%). Apprentices are employed under a formal contract and are paid for the duration of their apprenticeship.

Four of these new apprenticeships relate to the engineering profession (Table 14). These apprenticeships are generally placed at Level 7 on the NFQ with a B.Eng. award upon completion after 2-3 years. There are currently 211 apprentices registered on these programmes and the first cohort graduated in 2018. Further professional engineering apprenticeships are currently in development.

Table 14 Professional engineering apprentices [from SOLAS/DES]

New apprenticeships	NFQ	Duration	HEI lead	Industry lead	2016	2017	2018
Industrial Electrical Engineering	Level 7	2 years	LIT	Stryker	12	31	55
Manufacturing Technology	Level 6	2 years	GMIT	Medtech Assoc	-	40	69
Manufacturing Engineering	Level 7	3 years	GMIT	Medtech Assoc	-	36	50
Polymer Processing Technology	Level 7	3 years	AIT	Plastics Ireland	-	25	37
Total registered					**12**	**132**	**211**

It should also be noted that there is a major shortage of craft apprentices, numbers of which declined dramatically during the economic recession. While these apprentices do not qualify as engineers, many become engineering technicians or progress to study engineering. More importantly, apprentices play a vital role in the wider engineering and construction sector and the decline in apprentice registrations is a key component of skills shortages in the sector.

4.5. Gender gap in education

Bridging the gender gap must be a key driver in engineering and wider STEM education. In this light, it is very positive to note that women comprise the majority of students who sit Junior Certificate higher level papers in both science and mathematics (51%). Overall, at Junior Certificate level, 41% higher level STEM subject sitting are by female students, an increase of two percentage points in the past five years (Table 15). For the Leaving Certificate, 43% higher level STEM sittings are by female students, again an increase of two percentage points in the past five years (Table 16). However, this proportion is skewed by the number of female students taking higher level biology (62%) and chemistry (57%). Meanwhile, just 29% higher level physics students are women.

Table 15 Gender gap in Junior Certificate higher level STEM sittings in 2018

Subject	%Women	Year-on-year	5 year trend
Science	51%	n/c	+1pp
Mathematics	51%	n/c	+1pp
Material Technology	17%	+1pp	+5pp
Technical Graphics	18%	n/c	+4pp
Metalwork	10%	n/c	+3pp
Technology	22%	+4pp	+6pp
All STEM subjects	**41%**	**n/c**	**+2pp**

Table 16 Gender gap in Leaving Certificate higher level STEM sittings in 2018

Subject	%Women	Year-on-year	5 year trend
Biology	62%	n/c	+1pp
Mathematics	48%	+1pp	+1pp
Chemistry	57%	n/c	+3pp
Construction studies	11%	+1pp	+5pp
Agricultural science	43%	n/c	+3pp
Physics	29%	+2pp	+4pp
Engineering	7%	+1pp	+2pp
Design & comm.	15%	+1pp	+3pp
Applied mathematics	27%	+1pp	+4pp
Technology	17%	-1pp	n/c
Physics & chemistry	43%	+2pp	+3pp
All STEM subjects	**43%**	**+1pp**	**+2pp**

pp = percentage points; n/c = no change

Men greatly outnumber women at each stage of engineering higher education and in apprenticeships (Table 17). Women comprise 13% of new entrants and graduates (undergraduate and postgraduate), just one in eight.

The gender gap is larger in certain disciplines of engineering such as Civil & Building, Electrical & Electronic and Mechanical & Manufacturing. The gender gap is particularly alarming for apprenticeships where just 4% or 8 of 211 are women. This said, the gender gap has narrowed with the proportion of female engineering students generally increasing by four percentage points over the past five years.

Table 17 Percentage of students/apprentices who are women

	2012	2013	2014	2015	2016	2017	Year-on-year	5 year trend
New entrants								
Chemical & Process	49%	38%	52%	45%	34%	37%	+3pp	-12pp
Civil & Building	5%	5%	5%	6%	7%	8%	+2pp	+3pp
Mechanical & Manufacturing	3%	3%	5%	6%	8%	9%	+1pp	+5pp
Electrical & Electronic	8%	6%	6%	8%	8%	8%	n/c	n/c
Other/General	15%	14%	17%	20%	20%	21%	+1pp	+6pp
Total	**10%**	**9%**	**10%**	**12%**	**12%**	**13%**	**+1pp**	**+4pp**
Graduates (Levels 7-10)								
Chemical & Process	38%	36%	46%	49%	40%	41%	+1pp	+3pp
Civil & Building	8%	9%	10%	9%	9%	9%	-1pp	+1pp
Mechanical & Manufacturing	5%	8%	7%	9%	9%	8%	-1pp	+3pp
Electrical & Electronic	8%	8%	8%	8%	10%	9%	-1pp	+1pp
Other/General	15%	16%	17%	20%	20%	21%	+1pp	+6pp
Total	**10%**	**11%**	**12%**	**13%**	**13%**	**13%**	**n/c**	**+4pp**
Professional engineering apprentices								
Total	**n/a**	**n/a**	**n/a**	**n/a**	**0%**	**4%**	**+4pp**	**n/a**

pp = percentage points; n/c = no change; n/a = not applicable

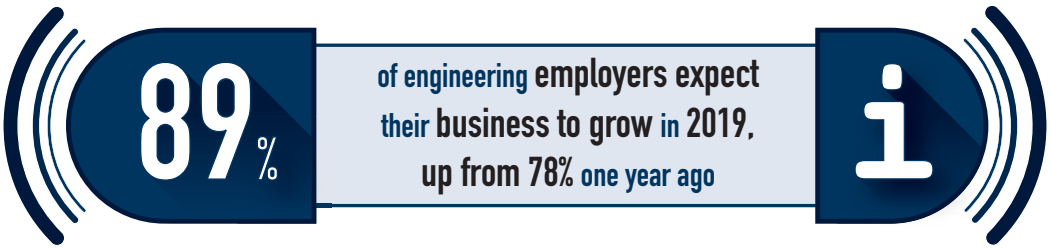

Allelys Group
Allelys Group

Conclusion

This final section of the report outlines four key trends, based on the preceding data, in engineering employment, perspectives and education. Understanding these trends helps Engineers Ireland and our members to advocate for the engineering profession and to deliver solutions for society. These trends also hold important lessons for industry, educational institutions, State bodies and industry who will all be instrumental in preparing Ireland for further changes in how we live, work and communicate.

Trend 1: Demand for engineers grows

The engineering employers we surveyed reported strong financial performance in 2018 with 77% growing their business, up from 63% in 2017. Only 6% of them experienced a decrease in their financial performance. These results echo the growth seen in engineering-related sectors of economy, as measured by the CSO. Engineering organisation's outlook for the remainder of 2019 is even more positive with 89% expecting their financial position to improve.



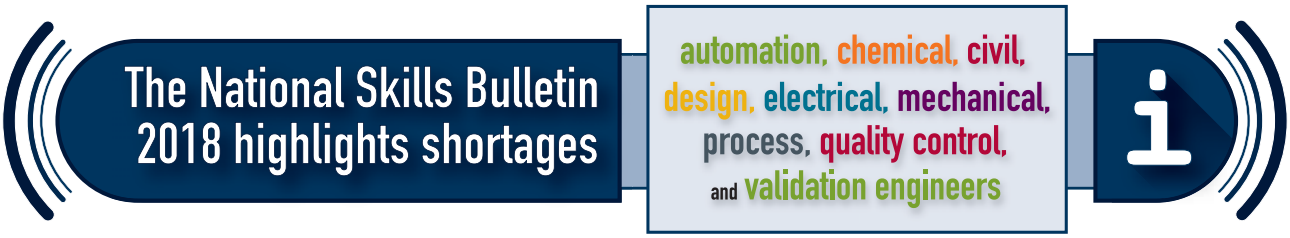
This business performance is translating into significant demand for engineers across each of the sectors studied in this report. We derived an estimate of 6,014 for the number of engineers employers would like to recruit this year. Consulting engineering companies have the most ambitious recruitment plans and the demand for Civil & Building Engineers is striking. The high level of demand for engineers has seen graduate engineer salaries increase by 21% in the past five years to €33,750.

Employers continue to value the Chartered Engineer title awarded by Engineers Ireland (which recognises professional expertise, leadership and ethical practice) such that Chartered Engineers earn €5,000 more per year than their untitled peers with the same number of years of experience. For example, the typical engineer with 6-10 years' experience and without a professional title earns €45,000, while a Chartered Engineer who graduated in the same year earns €50,000 on average.

Trend 2: Skills shortages become more acute

In last year's report, Engineering 2018, most employers told us that there was an inadequate supply of engineers to meet their needs in the medium term. This year, skills shortages have become more acute and the evidence of this has become even clearer. Almost all (94%) engineering employers consider a shortage of experienced engineers to be a barrier to growth – and 48% expect this situation to get worse in the year ahead.

The National Skills Bulletin 2018, which informs Government employment and education policy, now recognises shortages in almost all engineering occupations. While this means that there are plenty of job opportunities for engineering graduates, these skills shortages are restricting growth and the delivery of key projects. It is now a very real concern that shortages of Civil & Building Engineers, Mechanical & Electrical Engineers and other construction professionals could undermine the delivery of the National Development Plan 2018-2027.



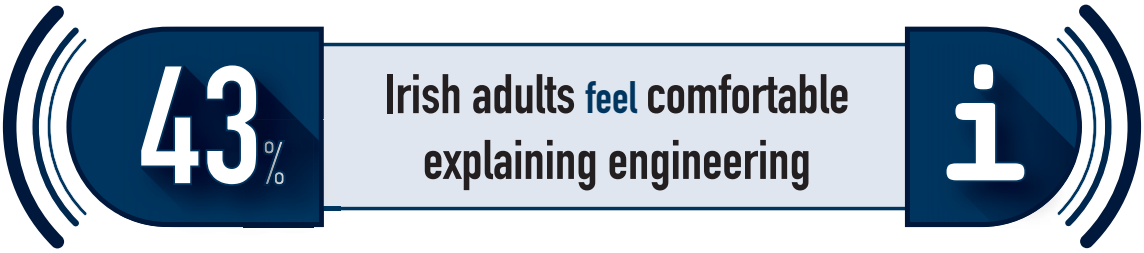
In this context, it is noteworthy that Civil Engineers are not included in the Highly Skilled Eligible Occupations List. By including Civil Engineers on this List, these professionals would become eligible for Critical Skills Employment Permits. In 2017, just 15 employment permits were issued to non-EEA national Civil Engineers / Construction Project Managers.

Engineers Ireland is exploring a variety of solutions to overcome engineering skills shortages, including but not limited to:

- Increasing the number of engineering graduates from higher education
- Promoting professional engineering apprenticeships
- Upskilling/reskilling those qualified/working in other fields
- Engaging with Irish engineers working abroad
- Attracting international engineers to Ireland
- Retaining qualified engineers in the profession

Trend 3: Importance of demystifying engineering

Just 43% of Irish adults would feel confident explaining engineering. Digging deeper into the results of our public poll shows that confidence explaining engineering is particularly low for women (36%) and the parents of secondary school children (35%). Demystifying engineering and promoting engineering as a career choice, particularly to young women, should be regarded as a challenge for all engineers and all those who promote STEM careers.

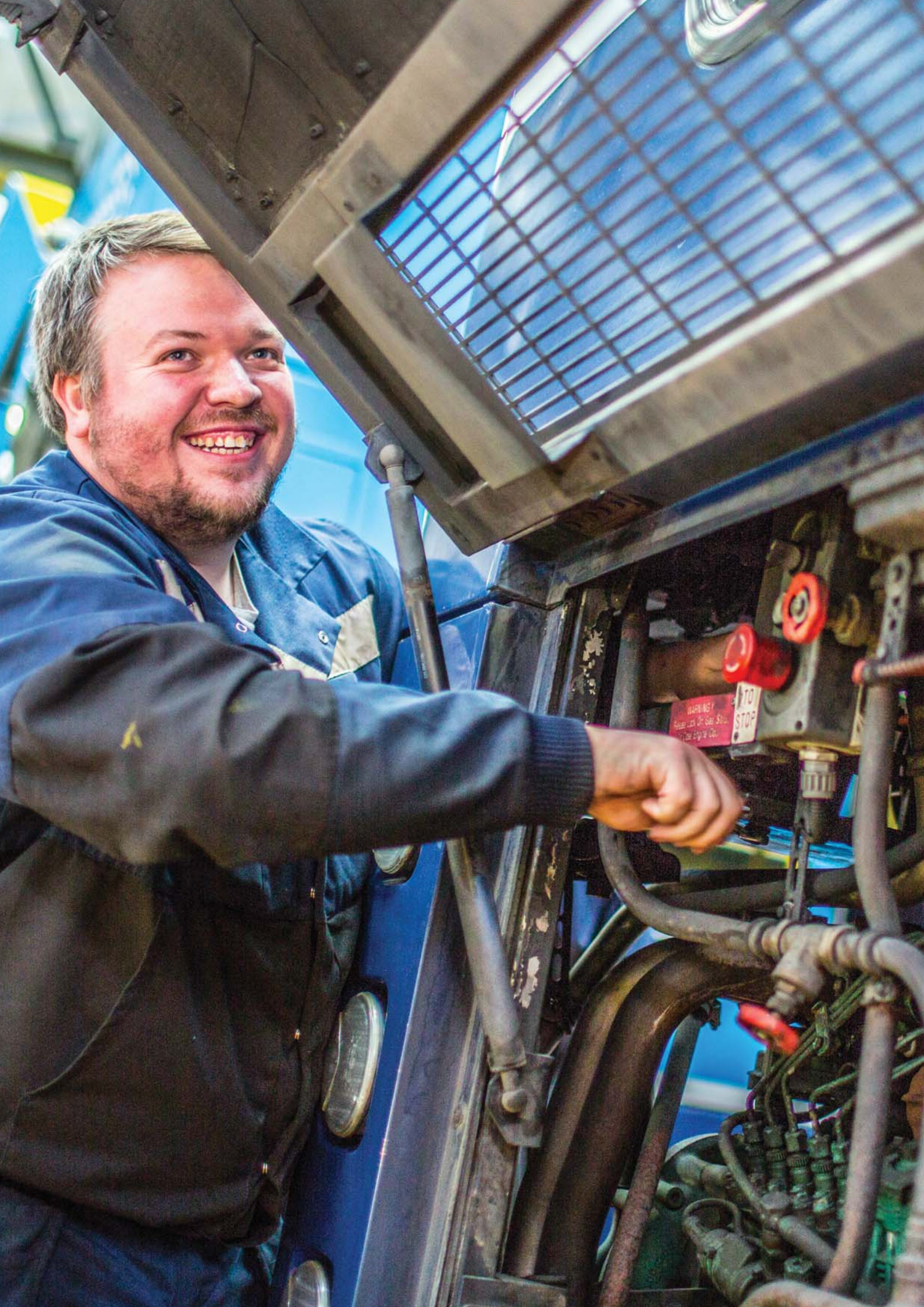


An initiative which is bearing fruit in this regard is Engineering Your Future, run by Engineers Ireland's STEPS Programme (funded by the SFI Discover Programme). Engineering Your Future introduces transition year students to the exciting and diverse world of engineering through immersive week-long experiences on higher education campuses throughout the country. Students gain hands-on experience of engineering through activities such as workshops, group projects, and industry visits. Engineering Your Future is complemented by other STEPS activities such as Engineers Week and the Young Engineers Award.

Trend 4: Committing to lifelong learning

In an era of digitalisation and rapidly-changing skills needs, lifelong learning is becoming increasingly important. Attaining a professional qualification is not the end of an engineer's professional development, it is just one stage in the process of lifelong learning. On joining Engineers Ireland, all members make a fundamental commitment to ongoing self-improvement. It is this underpinning ethos – the professional obligation to learn – that is a decisive contributor to the credibility in society of the engineering profession.

When identifying Continuing Professional Development (CPD), engineers, their employers and others should not only consider new technical competences, they should explore skills in emotional intelligence, creativity, communication, ethics and leadership. There is a very wide variety of learning activities that count as Engineers Ireland CPD – it is not just about attending paid courses and most incur no cost other than time. Engineers Ireland's MyCPD tool allows members to plan, record, reflect upon and refer to their CPD activities at any time.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Appendix 1 – Methodological Notes

Data sources

- The Future of Jobs Report 2018 was published by the World Economic Forum on 17th September 2018. Available at www.weforum.org
- The State of the European Consulting Engineering Sector – Barometer Autumn 2018 was published by the European Federation of Engineering Consultancy Associations (EFCA) on 26th November 2018. Available at: www.efcanet.org
- The National Skills Bulletin 2018 was published by the Further Education and Training Authority (SOLAS) on 12th December 2018. Available at: www.solas.ie
- Junior Certificate 2018 results were released by the State Examinations Commission on 12th September 2018. Available at: www.examinations.ie
- Leaving Certificate 2017 results were released by the State Examinations Commission on 15th August 2018. Available at: www.examinations.ie
- Data for higher education new entrants, enrolment and graduates were published by the Higher Education Authority (HEA) on 1st March 2018. Available at: www.hea.ie
- Apprenticeships registration data was provided by the Minister of State for Training and Skills to the Oireachtas on 24th October 2019. Available at: www.oireachtas.ie

Broad engineering disciplines

The broad engineering disciplines used in Sections 2 and 4 of this report are:

- Chemical & Process (Chem)
- Civil & Building (Civil)
- Electrical & Electronic (Elec)
- Mechanical & Manufacturing (Mech)
- Other / General (Other)

These broad disciplines were developed as part of the Engineering 2018 report to reclassify CSO and HEA data. The HEA uses the International Standard Classification of Education (ISCED) and the table below shows the grouping of these codes into the broad disciplines used in the report. 'Software and applications development' and 'Computer use' have not been included in this report.

ISCED name	ISCED code	Broad discipline
Electronics and automation	0714	Elec
Building and civil engineering	0732	Civil
Engineering not elsewhere classified	0710	Other
Mechanics and metal trades	0715	Mech
Electricity and energy	0713	Elec
Manufacturing and processing	0720	Mech
Chemical engineering and processes	0711	Chem
Motor vehicles, ships and aircraft	0716	Mech
Environmental protection technology	0712	Other

Employer survey

The engineering employer survey was conducted online between 18-31 October 2018. Participants were sought from Engineers Ireland's corporate partners and other affiliated employers, such as those who use Engineers Ireland's Jobs Desk. Respondents included 108 engineering organisations with a total of 36,778 employees in the Republic of Ireland. These organisations are primarily based in the following industries: manufacturing (34%), construction (23%), other (ICT, public sector, utilities etc., 24%) and consultancy (19%). Of the people responding to the survey, 71% worked in management/HR and 29% worked as engineers.

The forecast for the demand for engineers in 2019 was developed by extrapolating results to the full engineering labour force. Using a conservative estimate of 44,993 engineering professionals from Census 2016, the demand results of the survey were extrapolated to the full engineering labour force in the Republic of Ireland, weighted according to industry (manufacturing / construction / consultancy / other). The forecast was then checked against the CSO Labour Force Survey time series.

Engineers Ireland member survey

The Engineers Ireland member survey was conducted online between 9-23 January 2019. A link to the survey was emailed to members of Engineers Ireland on 23 January. There were 1,908 responses, of which 87% were men and 13% were women. The breakdown of the sample according to experience was: 1-2 years (3%), 3-5 years (8%), 6-10 years (20%), 11-15 years (20%), 16-20 years (17%), 21-25 years (13%), 26-30 years (8%) and 30+ years (11%). The breakdown of the sample according to membership type / professional title was: untitled Member (48%), Chartered Engineer (44%) and Fellow (4%).

A full Engineers Ireland Salary Survey 2019 report is available to Engineers Ireland members and can be downloaded from the members' area of www.engineersireland.ie.

Public survey

The public survey was conducted face-to-face by Behaviour & Attitudes between 17-29 January 2019. 1,000 adults (aged 16 and over), statistically representative of the adult population in Ireland (in terms of age, gender, region and socio-economic class), were polled at randomly-chosen sampling points. For more information, see www.banda.ie/techniques/barometer/

Appendix 2 – CAO Engineering Options

Engineers Ireland accredits over 100 programmes across the diverse disciplines of engineering. Our accreditation assures you that your course has been subjected to a rigorous process of evaluation and is internationally recognised. Graduating from an accredited course will also bring plenty of advantages to your future career, particularly if you wish to apply for one of Engineers Ireland's Professional Titles: Chartered Engineer with further learning (CEng), Associate Engineer (AEng) or Engineering Technician (EngTech). The table below shows the CAO codes/courses which can lead to an Engineers Ireland accredited qualification. See www.engineersireland.ie/services/accredited-courses.aspx for the list of our accredited courses by programme.

HEI	CAO code	Course name	Level	Eligibility
AIT	AL601	Electronics and Computer Engineering	6	EngTech
AIT	AL602	Mechanical Engineering	6	EngTech
AIT	AL604	Civil Engineering	6	EngTech
AIT	AL701	ICT Engineering: Computer Eng or Network Mgmnt or Electronic Comms	7	AEng
AIT	AL704	Computer Engineering	7	AEng
AIT	AL710	Mechanical Engineering	7	AEng
AIT	AL711	Mechanical Engineering and Renewable Energy	7	AEng
AIT	AL712	Mechatronics	7	AEng
AIT	AL713	Engineering (Common Entry to Mechanical/Renewable/Mechatronic Eng)	7	AEng
AIT	AL721	Civil Engineering	7	AEng
CIT	CR075	Biomedical Engineering	7	AEng
CIT	CR051	Civil Engineering	7	AEng
CIT	CR071	Mechanical Engineering	7	AEng
CIT	CR095	Marine Engineering at National Maritime College of Ireland	7	AEng
CIT	CR061	Electronic Engineering	7	AEng
CIT	CR062	Electrical Engineering	7	AEng
CIT	CR500	Engineering (Common Entry)	8	CEng
CIT	CR105	Chemical and Biopharmaceutical Engineering	8	CEng
CIT	CR109	Structural Engineering	8	CEng
CIT	CR520	Biomedical Engineering	8	CEng
CIT	CR108	Mechanical Engineering	8	CEng
DCU	DC190	Electronic and Computer Engineering (choice of four majors)	8	CEng
DCU	DC200	Common Entry into Engineering (Undenominated Entry)	8	CEng
DCU	DC197	Biomedical Engineering	8	CEng
DCU	DC193	Mechatronic Engineering	8	CEng
DCU	DC195	Mechanical and Manufacturing Engineering	8	CEng
DIT	DT097	Engineering (General Entry)	7	AEng
DIT	DT003	Automation Engineering	7	AEng
DIT	DT004	Civil Engineering	7	AEng

DIT	DT005	Building Engineering	7	AEng
DIT	DT006	Mechanical Engineering	7	AEng
DIT	DT008	Electronics and Communications Engineering	7	AEng
DIT	DT009	Electrical and Control Engineering	7	AEng
DIT	DT010	Electrical Services Engineering	7	AEng
DIT	DT066	Engineering (General Entry)	8	CEng
DKIT	DK740	Engineering (Electrical and Electronic Systems)	7	AEng
DKIT	DK742	Engineering (Mechanical Engineering)	7	AEng
DKIT	DK744	Engineering (Civil Engineering)	7	AEng
GMIT	GA570	Software and Electronic Engineering	7	AEng
GMIT	GA670	Mechanical Engineering	7	AEng
GMIT	GA676	Engineering (Common entry to Manu/Agri/Biomed/Energy/Mech Eng)	7	AEng
GMIT	GA473	Civil Engineering	7	AEng
GMIT	GA673	Energy Engineering	7	AEng
GMIT	GA484	Civil Engineering	8	CEng
GMIT	GA684	Engineering (Common entry to Manu/Agri/Biomed/Energy/Mech Eng)	8	AEng
GMIT	GA680	Mechanical Engineering	8	AEng
GMIT	GA681	Energy Engineering	8	AEng
ITB	BN001	Electronics and Computer Engineering	6	EngTech
ITB	BN009	Mechatronic Engineering	7	AEng
ITB	BN012	Computer Engineering	7	AEng
ITB	BN015	Engineering (Common Entry with Award options)	7	AEng
ITB	BN108	Engineering (Common Entry with Award options)	8	AEng
ITB	BN117	Computer Engineering in Mobile Systems	8	AEng
ITB	BN121	Mechatronic Engineering	8	AEng
ITC	CW507	Aircraft Systems	7	AEng
ITC	CW527	Electronic Engineering	7	AEng
ITC	CW427	Civil Engineering	7	AEng
ITC	CW517	Mechanical Engineering	7	AEng
ITC	CW478	Civil Engineering	8	CEng
ITS	SG300	Engineering (Undenominated)	6	EngTech
ITS	SG301	Civil Engineering	6	EngTech
ITS	SG303	Mechanical Engineering	6	EngTech
ITS	SG305	Electronic and Computer Engineering	6	EngTech
ITS	SG300	Engineering (Undenominated)	7	AEng
ITS	SG333	Mechanical Engineering	7	AEng
ITS	SG337	Electronic and Computer Engineering	7	AEng
ITS	SG338	Civil Engineering	7	AEng
ITS	SG342	Civil Engineering	8	CEng
ITTA	TA201	Electronic Engineering	6	EngTech
ITTA	TA203	Mechanical Engineering	6	EngTech
ITTA	TA216	Electronic Engineering	7	AEng
ITTA	TA213	Mechanical Engineering	7	AEng

ITTA	TA221	Electronic Engineering	8	AEng
ITTR	TL744	Agricultural Engineering	7	AEng
ITTR	TL745	Civil and Environmental Engineering	7	AEng
ITTR	TL844	Agricultural Engineering	8	AEng
LIT	LC281	Automobile Technology	6	EngTech
LIT	LC284	Agricultural Mechanisation	6	EngTech
LIT	LC251	Civil Engineering	7	AEng
LIT	LC252	Civil Engineering Management	8	AEng
LIT	LC278	Renewable and Electrical Energy Engineering	7	AEng
LIT	LC279	Electronic Engineering	7	AEng
LIT	LC285	Mechanical Engineering	7	AEng
LIT	LC288	Mechanical Engineering	8	AEng
LIT	LC241	Construction Management	8	AEng
LkIT	LY508	Fire Safety Engineering	8	AEng
LkIT	LY517	Building Services and Renewable Energy	7	AEng
LkIT	LY527	Civil Engineering	7	AEng
LkIT	LY607	Electronic/Computer Engineering (Common Entry)	7	AEng
LkIT	LY617	Mechanical Engineering	7	AEng
MU	MH304	Engineering	8	CEng
NUIG	GY401	Engineering (Undenominated)	8	CEng
NUIG	GY402	Civil Engineering	8	CEng
NUIG	GY405	Mechanical Engineering	8	CEng
NUIG	GY406	Electronic and Computer Engineering	8	CEng
NUIG	GY408	Biomedical Engineering	8	CEng
NUIG	GY413	Energy Systems Engineering	8	CEng
NUIG	GY414	Electrical and Electronic Engineering	8	CEng
TCD	TR032	Engineering	8	CEng
TCD	TR033	Computer Science	8	CEng
TCD	TR038	Engineering with Management	8	CEng
UCC	CK600	Engineering (Degree options)	8	CEng
UCD	DN150	Engineering	8	CEng
UL	LM077	Aeronautical Engineering	8	CEng
UL	LM116	Engineering	8	CEng
UL	LM118	Electronic and Computer Engineering	8	CEng
WIT	WD011	Mechanical Engineering	6	EngTech
WIT	WD010	Electronic Engineering	6	EngTech
WIT	WD040	Building Services Engineering	6	EngTech
WIT	WD139	Civil Engineering	7	AEng
WIT	WD208	Manufacturing Engineering	7	AEng
WIT	WD206	Electronic Engineering	7	AEng
WIT	WD207	Mechanical Engineering	7	AEng
WIT	WD025	Construction Management and Engineering	8	AEng
WIT	WD007	Engineering	8	CEng
WIT	WD230	Mechanical and Manufacturing Engineering	8	CEng

Notes

ENGINEERS IRELAND

In particular we would like to see more young women become engineers

Supporting our organisations

- Engineers Ireland Jobs Desk
- Corporate Partner membership
- CPD accreditation
- Registered training providers
- Policy development representation
- Professional registers
- School and college programmes

Supporting our professionals

- Knowledge
- Recognition
- Community
- Professional development
- Career guidance
- Advocacy
- Networking

Further details at www.engineersireland.ie

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