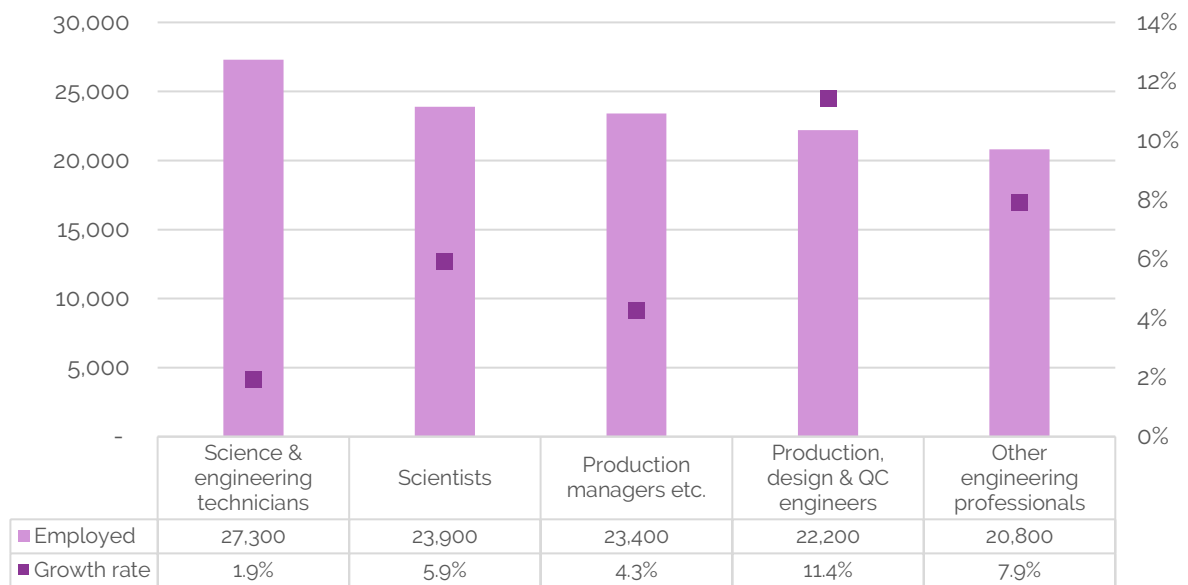


## 10.1 Science & Engineering Occupations

Figure 10.1 Annual Average Employment (2022) & Annual Average Growth Rates (2017-2022)



<b>Overall employment</b>	<b>117,600</b>
<b>Share of total workforce</b>	4.6%
<b>Main sectors of employment</b>	55% - Industry 17% - Professional activities
<b>Employment growth</b>	+28,800 between 2017 and 2022 +5.8% on average annually (compared to +3.0% for total workforce)

2022	% Female Q4	% Full-time Q4	% Aged 55 years & over Q4	% Irish citizens Q4	% Third level graduates Q4	Number of new employment permits	Recruitment Agency Survey
Scientists	53%	95%	...	81%	98%	506	✓
Other engineering professionals	...	99%	...	78%	91%	1,505	✓
Production, design & QC engineers	[32%]	99%	...	77%	95%	1,720	✓
Science & engineering technicians	39%	94%	...	83%	77%	138	✓
Production managers etc.	[23%]	97%	[22%]	78%	80%	76	
<b>Overall total</b>	<b>33%</b>	<b>97%</b>	<b>14%</b>	<b>79%</b>	<b>87%</b>	<b>3,945</b>	

Source: SLMRU (SOLAS) analysis of CSO (LFS) data, DETE, and SLMRU Recruitment Agency Survey (RAS)  
Numbers in square brackets should be treated with caution; an ellipsis ( ...) denotes numbers too small to report

## Overall Outlook for these Occupations

Employment grew strongly for this occupational group over the five-year period, with above average growth across all occupations excluding technicians; however, between 2021 and 2022, employment grew by just 2,000 persons overall. Over half (55%) of employment was concentrated in industry. Only a third of those employed were female, significantly below the national average of 47%, and almost all employed were in full-time roles. The number of new employment permits issued in 2022, at almost 4,000, exceeded annual employment growth for the year; the share of non-Irish citizens was above the national average for a number of occupations in this group. The recent slowdown of outputs and exports from multinational enterprises, including pharma-related manufacturing, may dampen future growth for some of these occupations if this pattern persists. However, the impact of the green agenda (sustainability) means that as industries in Ireland address issues such as sustainable sourcing, circular lifecycles, energy efficiency, and waste minimization, the skills mix of the workforce will also need to evolve, with a continued strong demand for scientists and engineers in order to fully implement these changes.

Output from third level education remains strong: at levels 8-10, there were nearly 6,000 science awards and over 4,000 engineering/manufacturing awards made in 2021 to students at HEA-funded institutions; annual increases in graduate numbers mean that levels in 2021 were more than a quarter higher than they had been in 2017. Nonetheless, while these numbers are more than sufficient to meet replacement demand and growth, the skills of these graduates are in strong demand across a wide range of other economic sectors (e.g. education, health, ICT). Supply from the FET system has continued to expand, with approximately 5,400 full completers from science or engineering related programmes in 2022 (excludes Safepass certifications), up from 3,300 in 2021. In addition, there is a range of new apprenticeship programmes aimed at developing skills for these occupation with 314 new apprenticeship registrations in 2022 (three times the number for 2017, when the first of these new programmes was introduced).

Occupation	Economic summary
Scientists  <b>Skills shortage: Analytical, process, and medical scientists</b>	<p>The annual employment growth rate over the five-year period was above average for this occupation, with employment increasing by almost 2,000 persons between 2021 and 2022. Almost a third of employment was in industry with the remainder spread across many sectors. The number of new employment permits issued grew from 164 to 506 between 2021 and 2022, with two fifths of permits issued for roles in the manufacturing of chemicals/pharma sub-sector for scientists and analysts (e.g. quality control, chemists); other roles include medical scientists/technologists, microbiologists, process development and R&amp;D scientists. In June 2022, medical scientists were moved to the Critical Skills Employment Permit List due to issues with sourcing suitable candidates; in Summer 2023, the Government announced plans to expand the number of training places for medical scientists by 20 places. The Recruitment Agency Survey identified difficult-to-fill vacancy mentions for analytical and process scientists. Online job adverts for this occupation grew slightly in 2022, almost all related to posts for R&amp;D managers. This was the most frequently occurring occupation in online job adverts in 2022.</p> <p>With employment levels increasing and demand still evident, shortages are expected to persist for this occupation, particularly in the chemical/pharmaceutical manufacturing sector, for those with experience and/or in niche areas. The recent decline in the value of pharmaceutical exports in Ireland is unlikely to have a significant impact on the demand for skills as, in addition to being in strong demand in the pharma &amp; biopharma processing industry, they are much sought after elsewhere in both the life sciences sector (e.g. medical devices) and other manufacturing (e.g. food &amp; beverage); in addition, Government focus (and investment) on research and innovation will also sustain the already strong demand for these skills<sup>1</sup>. Shortages of analytical, process and medical scientists are likely to continue.</p>
Production, design & QC engineers	<p>Employment grew strongly for this occupation between 2018 and 2021, although employment remained unchanged in the most recent time period. Almost three quarters were employed in industry. Despite the static employment levels in 2022, there was a significant increase in the number of employment permits issued between 2021 and 2022 (by 1,100), with the industrial sector accounting for half of the increase. Roles for which permits were issued included quality, process, and design engineers. This occupation had the highest number of mentions of vacancies that were difficult to fill in the Recruitment Agency Survey, especially for quality control/assurance,</p>

<sup>1</sup> <https://www.gov.ie/en/publication/27c78-impact-2030-irelands-new-research-and-innovation-strategy/>

<p><b>Skills shortage:</b> <b>Quality control/assurance, process, and design engineer</b></p>	<p>compliance/regulatory and process engineering roles. Employers (through Skills for Growth and/or Spotlight on Skills) have cited roles in design engineering (with specific industry knowledge), quality control and production engineers as being difficult to fill. Demand continues to be strong for this occupation despite static employment levels and issues with recruiting suitably qualified/experienced candidates for these roles are likely to persist.</p>
<p>Other engineering professionals (e.g. mechanical, electrical and electronic engineers)</p> <p><b>Skills shortage:</b> <b>Engineers (mechanical, electrical, automation)</b></p>	<p>Despite a strong five-year annual average employment growth rate, the numbers employed declined marginally between 2021 and 2022. Over half (55%) were employed in the professional activities sector with the remainder spread across industry and other sectors. The number of employment permits issued in 2022 grew strongly (and remained strong in the first five months of 2023) in roles including electrical, mechanical, automation, and validation engineers. There is evidence in the Recruitment Agency Survey of difficulties in filling vacancies for roles in electrical, automation, mechanical, and environmental health &amp; safety (EHS) engineers. Skills for Growth and Spotlight on Skills data highlight issues with sourcing mechanical, automation and process engineers, with project management, Lean Six Sigma, and CAD/AutoCAD skills in particular demand for these roles. Despite a 3% fall in 2022, this occupation was amongst the most frequently mentioned in online job adverts.</p> <p>Overall demand for this occupation may moderate, although this may be offset by any increase in the extension of Industry 4.0 and Industry 5 technologies to more traditional manufacturing sectors and smaller sized companies; in addition, increased activity associated with the generation of green energy (mechanical/electrical) will also drive demand for these skills. As such, difficulty in sourcing suitably qualified and experienced engineers is expected to continue, albeit in smaller numbers.</p>
<p>Science &amp; engineering technicians</p> <p><b>Skills shortage:</b> <b>Maintenance/lab technicians</b></p>	<p>Employment levels fell between 2021 and 2022, by approximately 3,000 persons, but remained above 2017 levels, resulting in a positive, but below average, annual average growth rate for the five-year period. Employment for this occupation was primarily in industry (accounting for a 60% share of employment). Employment permits issued were across a variety of technician roles (e.g. process, manufacturing, laboratory). The Recruitment Agency Survey identified vacancies for maintenance technicians in manufacturing with electrical/mechanical skills as difficult-to-fill. Employers (Skills for Growth) experienced difficulties in filling a range of engineering technician roles, including aircraft technicians and manufacturing technicians, particularly for those with digital skills and knowledge of procedures/processes. There was a 3% increase in the number of online job adverts in 2022, driven by increases in electrical/electronic technicians and, to a lesser extent, laboratory technicians. New apprenticeship registrations for a number of industry related technicians (including lab analysts) have risen strongly since the first of these programmes were introduced in 2017; by 2022 there were 314 new registrations across a range of apprenticeships (lab analyst, manufacturing technology, OEM engineer etc.) up from approximately 100 in 2017. Although demand seems to be lessening for these roles, issues with attracting suitable candidates remain for maintenance and laboratory technicians in particular, at least in the short-term.</p>
<p>Production managers in manufacturing</p>	<p>Employment numbers in this occupation have grown strongly since 2020, with an additional 8,300 persons employed. Employment permits were issued across a number of managerial roles in manufacturing. Skills for Growth and Spotlight on Skills data point to issues in sourcing production managers, often with mechanical engineering, GMP, health &amp; safety, and project management (including Lean processes) skills. Issues in relation to sourcing candidates with specific skills sets and industry experience have been identified and may result in future shortages if employment continues to rise.</p>