Semiconductor-related higher education and employment

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Executive summary

- **Student demand for chip programmes nearly doubled between 2019 and 2025, but universities haven't kept pace.** Programme growth has slowed dramatically since 2022, creating a significant gap between what students want and what's available.

- **Master's programmes are the most undersupplied.** These programmes attract 60% of student demand but make up only 30% of what universities offer. This represents the clearest opportunity for institutions looking to expand.

- **The US has the most programmes, but China is seeing the fastest growth in student demand.** Student interest is also growing rapidly from Tunisia, the US, Italy, Bangladesh, and Türkiye. These are markets worth attention for university recruitment.

- **Most graduates work outside the chip industry.** About 20% of chip programme graduates end up in semiconductor jobs, with the rest working across four main industries. Together, just four companies (Apple, ASML, Infineon, and Intel) hire more than one-third of graduates who get jobs at top firms.

Where this data comes from

This report uses Studyportals data that tracks how students search for programmes and what universities offer. It covers 2019 to 2025 and includes all types of chip-related programmes worldwide, from general subjects like electrical engineering to more specific programmes like semiconductor photonics.

The report also uses employment data from 310,000 international graduates between 2019 and 2024. This shows which industries, companies, and job roles chip programme graduates enter after they finish their studies.

Why everyone suddenly cares about chips

A decade ago, most people had never heard the word "semiconductor." Today, these tiny chips are at the centre of global power struggles. Semiconductors are inside everything: your phone, your car, hospital equipment, even weapons systems. The countries that control chip technology increasingly control the future.

The US dominates design, contributing over 70% of the world's intellectual property. Taiwan and South Korea manufacture most advanced chips. Europe, Japan, and the US make the specialised equipment needed to produce them. This interdependent setup means any disruption in one region affects everyone.

Governments are pouring billions into chip factories, but you can't run a factory without trained workers.

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Semiconductors have become critical to everything from national security to the economy.

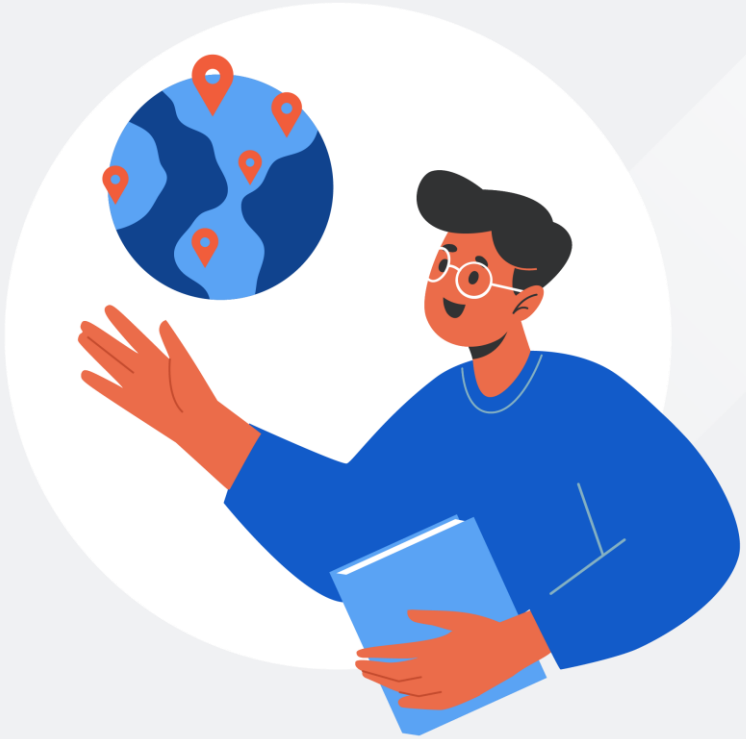
Part one: The state of semiconductor education

Student demand for chip-related programmes doubled. Programmes have not.

Between 2019 and 2025, student searches for chip-related programmes nearly doubled. Programme availability grew much more slowly. Since 2022, growth has basically flatlined.

Master's programmes attract 60% of total student demand but make up only 30% of available programmes. This represents the most acute supply-demand imbalance in semiconductor education today.

The semiconductor workforce is evolving to demand both broader and more specialised skill sets—institutions must expand capacity, refresh curricula, strengthen interdisciplinary pathways, and develop programmes that clearly align with emerging areas of demand.



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Why universities are struggling to scale programmes

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Yet high equipment costs, and fast-evolving technology create real capacity constraints.

Astronomical Equipment Costs

Machines needed to train semiconductor engineers cost hundreds of millions of dollars each.

Outdated Degree Models

Conventional single-discipline degrees are not sufficient for modern chip jobs requiring cross-disciplinary knowledge.

Facility Requirements

Even with equipment, universities need specialized facilities and trained staff to operate them

How some universities are solving the problem

Digital Twin Technology

Purdue is developing virtual replicas of semiconductor manufacturing processes. Students practice on simulated equipment before touching real machines.

Fast-Track Programmes

Taiwan's three-month programme trained 1,100+ students with zero science background since 2020. 70% successfully landed tech jobs.

Industry Partnerships

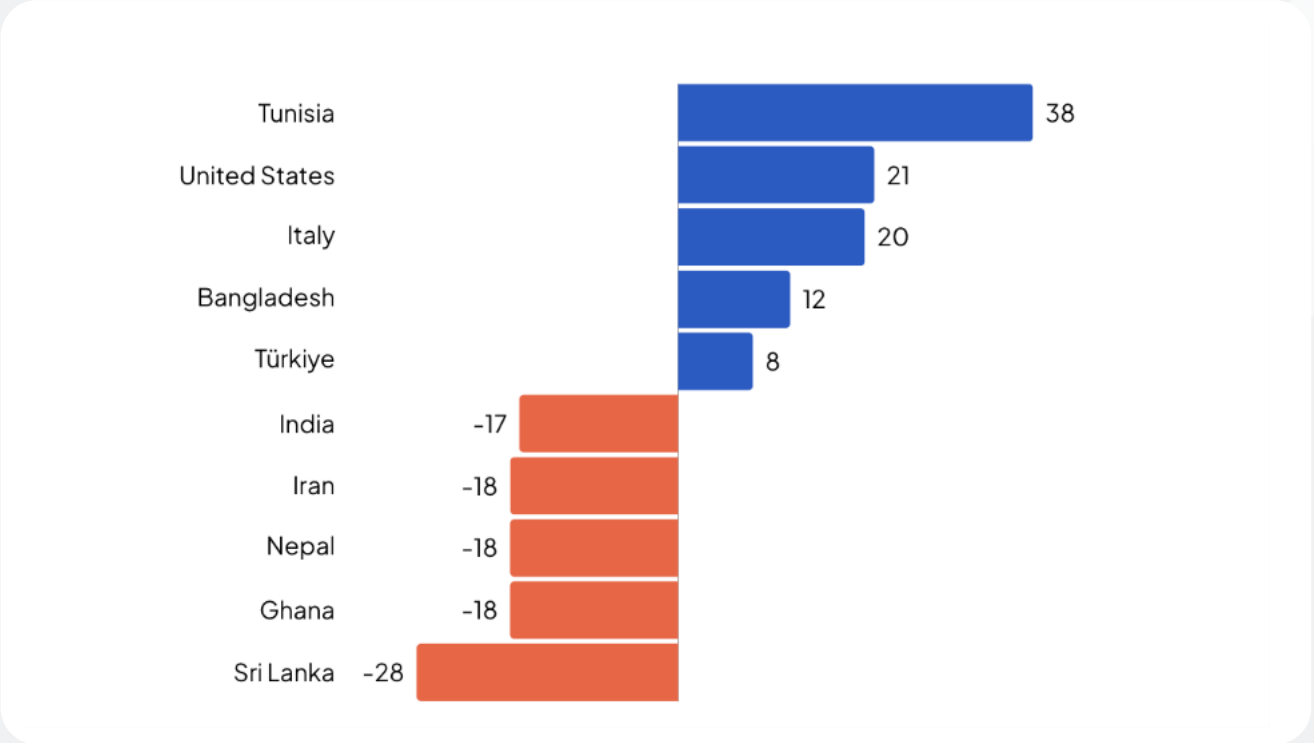
Seoul National University's GSSS Program: Samsung jointly selects students, provides full scholarships, and guarantees employment after graduation.

Student interest in chip-related programmes

If you're recruiting from Bangladesh or Tunisia, now's the time to invest there.

The cooling demand from India may reflect the country's push toward semiconductor self-sufficiency. India is gearing up for a "breakout moment" with indigenous 32nm chip production and initiatives like the Chips to Startup (C2S) programme aiming to train 85,000 engineers by 2027. As India builds domestic capacity, fewer students may need to study abroad for semiconductor education.

Top 5 growing & declining origin countries (%) in terms of student interest in chip-related programmes

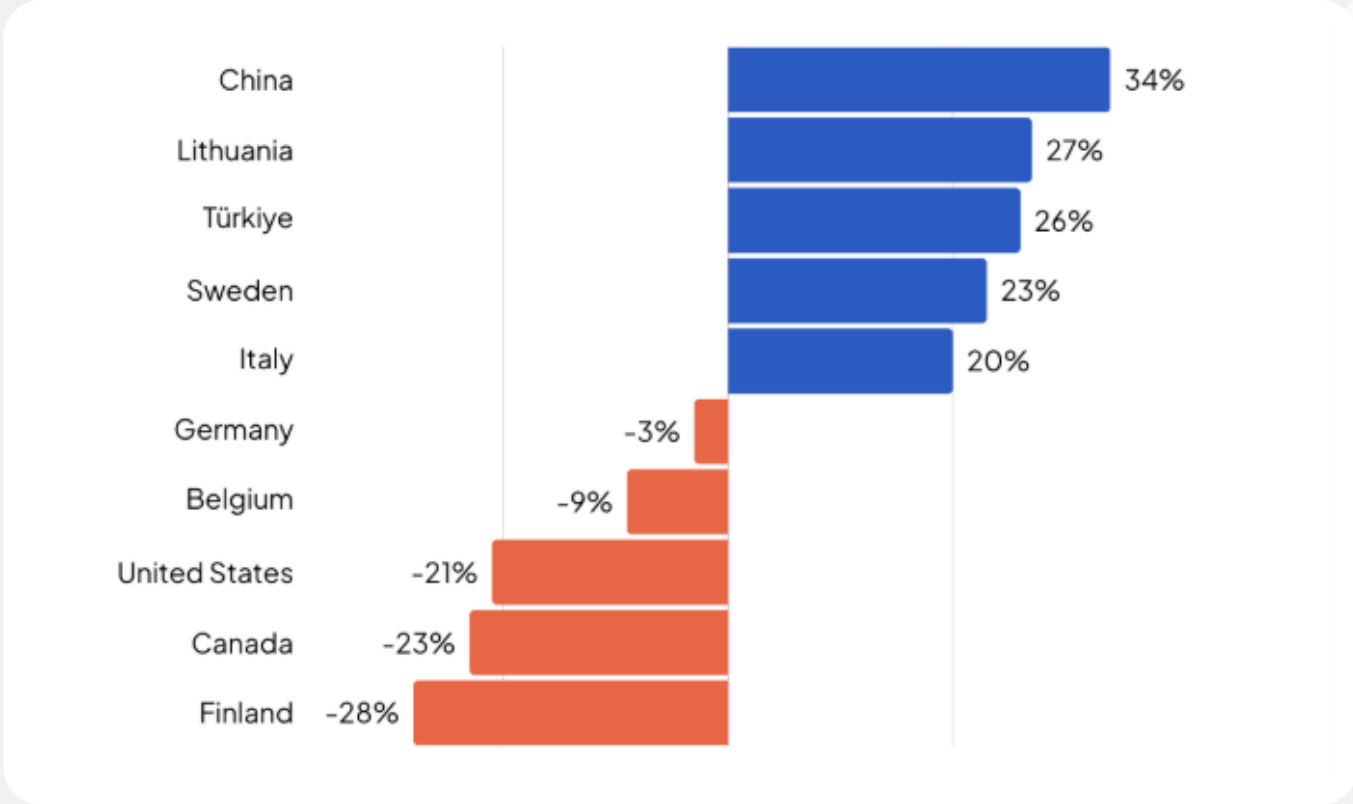


Destinations attracting student interest

The US and UK still offer more chip-related programmes than anywhere else, with 807 programmes and 418 programmes respectively.

But total programme counts only tell part of the story. Look at where student interest is actually growing (and dropping) the fastest.

Top 5 growing & declining destination countries (%) in terms of student interest in chip-related programmes



Three ways universities can respond

Focus on master's programmes

Master's programmes are massively undersupplied. This is the clearest gap and probably the fastest way to meet demand. Universities that move on this now become essential.

Create specialised programmes

You don't need a famous name to attract students—you need the right focus and industry ties. Specialised programmes in nanotechnology, analog design, and semiconductor fabrication show strong demand.

New recruitment markets

Bangladesh, Turkey, and Tunisia are growing recruitment markets worth attention. If you're recruiting from these regions, now's the time to invest there.

Part two: The semiconductor graduate market

Most semiconductor-related graduates were employed in five core industries

Based on an analysis of 310,000 international graduates (2019–2024).

28%

Appliances & Electronics

24%

Renewable Energy

20%

Semiconductor Manufacturing

11%

Computers & Electronics

17%

All other industries

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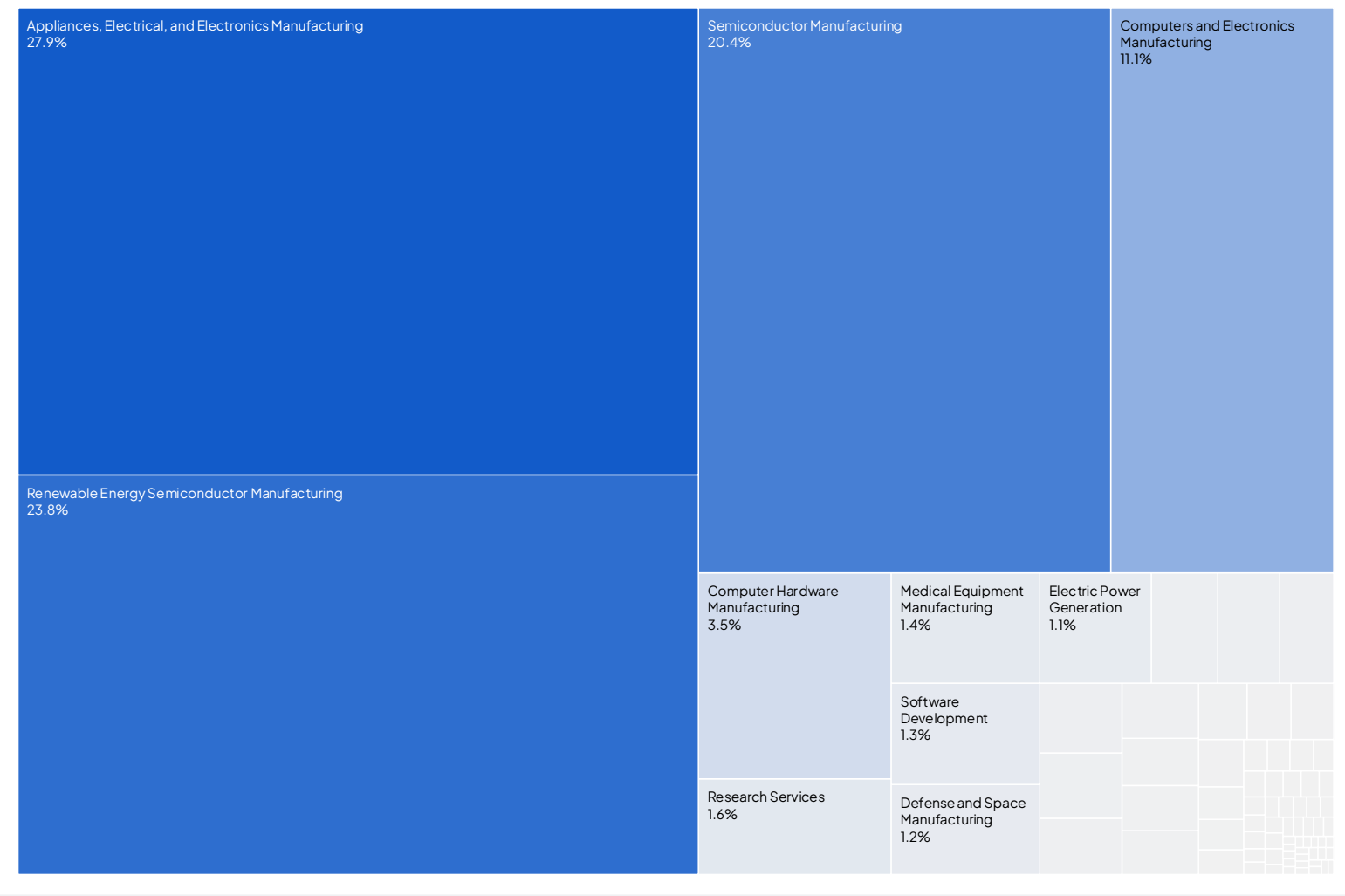
High-value jobs in smaller industries

A limited share of employed individuals also enter sectors such as computer hardware manufacturing (3.5%), research services (1.6%), software development (1.3%), and defense and space manufacturing (1.2%). Although these appear to be relatively small in proportion, they often require **highly specialised roles** (e.g., VLSI design, chip architecture, materials R&D) and may present **high-value employment opportunities** for those with niche skill sets.

Share of employments in semiconductor-related industries (2019-2024)



Which companies hire the most graduates

The semiconductor workforce is being shaped by firms that sit at the centre of the global chip design, manufacturing, and advanced electronics ecosystem.

Graduates aspire toward companies that operate across the high-value segments of the supply chain (e.g., design, advanced manufacturing, lithography, etc).

Across the sectors, hiring accelerated sharply between 2020-2022, then diverged as the sector faced increasing volatility. Dell Technologies exhibited the sharpest post-2022 decline, underscoring how shifts in consumer electronics markets can dampen recruitment.

Top employers:
A concentrated talent market

These top four companies account for more than one-third of all graduate placements in top-tier firms.

Apple and Infineon sustained strong demand for new talent, reflecting continued investment in custom silicon and power electronics, while Intel and ASML, after steep rises, saw pronounced slowdowns likely linked to restructuring pressures and easing supply chain constraints.

While ASML announced it will lay off around 1700, mainly managers. It continues to expand, announcing plans in early 2026 to strengthen focus on engineering and innovation.

Other firms such as Honeywell, Siemens Gamesa, Micron Technology, and AMD also play significant but smaller roles, absorbing between 100–200 graduates each. This reflects a diverse but hierarchical employment landscape in which a few industry leaders anchor the talent market, while many others provide specialised or niche opportunities.

Apple

Leading recruiter, sustained strong demand through 2024

Intel

Steep rise followed by slowdown linked to restructuring

Infineon

Sustained growth in power electronics and custom silicon

ASML

Post-2022 slowdown, but expanding engineering focus in 2026

Most common job roles

- The most common job titles are software and engineering roles. Across all semiconductor-related industries, graduates most often become software engineers, electrical engineers, process engineers, and project engineers. These same roles appear in every major sector.
- This shows how hardware and software work together in the chip industry. Hardware design, embedded systems, software optimization, and electronics engineering are now deeply connected. Graduates need skills that cross multiple areas.
- In renewable energy, project management roles lead. Project managers and project engineers get hired the most in this field. This reflects the rapid growth of grid technologies, power electronics, and energy systems tied to the shift toward green energy.
- Chip manufacturing needs technical specialists. Process engineers, analog design engineers, and application engineers form the core hiring needs in semiconductor manufacturing. Consumer electronics and appliances companies hire a wider mix including product specialists, data analysts, and mechanical engineers, showing the many different ways semiconductors are used.
- Some rare jobs are critical for specialised work. Positions like RF engineer or process integration engineer appear in very small numbers but remain essential for highly specialised parts of the semiconductor industry. This shows that the industry needs both broad engineering skills and advanced technical specialisation to keep growing.

About the Author

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Cara is a communications specialist with a strong background in journalism and a passion for storytelling that drives impact. She plays a pivotal role in shaping Studyportals' thought leadership initiatives. In collaboration with subject matter experts, she identifies emerging trends to develop high-impact intelligence reports. Cara has a Bachelor of Journalism from Rhodes University in South Africa. She has an MBA from the University of Oxford, where she was a Chevening scholar, where she co-chaired the Media and Marketing Oxford Business Network.

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