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# Study of Engineering and Engineering Technology Graduates in British Columbia

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## Introduction

The BC public post-secondary education system has for many years produced excellent engineering and engineering technology graduates to support industry throughout the province. The main fields of civil, electrical and mechanical have always been represented, along with more specialized fields such as mining, chemical, physics, environmental, computing and so on based on industry needs and student interest.

Originally, the engineering technology programs were provided with program specific funding, with full time equivalent (FTE) student targets for each of these programs. In reality, this was more of a funding algorithm rather than an accountability measure, but it did establish program capacity in each case. Over twenty years ago, the province moved to base funding such that public institutions were given a grant based on overall institutional FTE targets, so program-specific targets disappeared in most cases. As new programs were approved at institutions, these were either offered (1) through existing funding and tuition revenue; or (2) in response to specific government funding opportunities (targeted in recent years towards trades, computer science, healthcare, and early childhood education).

In general, this funding approach has somewhat curtailed institutions from launching new programs unless there was specific government funding available. These targeted program areas have been well supported but engineering and engineering technology programs have faced a more difficult road. There has been a perception that engineering technology program growth has stagnated, while engineering program growth has been fairly modest but significant (in particular, the launch of the School of Engineering at UBC Okanagan was a much needed boost for engineering output with new graduates entering the workforce starting in 2009).

In order to begin assessing if the provincial output of engineers and engineering technologists is meeting the needs of industry, it was identified that an important first step would be to evaluate the actual graduation numbers from BC public institutions in these program areas. The study that follows provides this important information.

## Study Details

This study examines the output of graduates from public BC colleges, institutes and universities of both two-year engineering technology diploma programs and four-year engineering undergraduate degree programs over a fifteen-year timeframe (2009 through 2023). The data has been gathered from Statistics Canada and from various colleges, institutes and universities. The list of institutions and data sources are shown



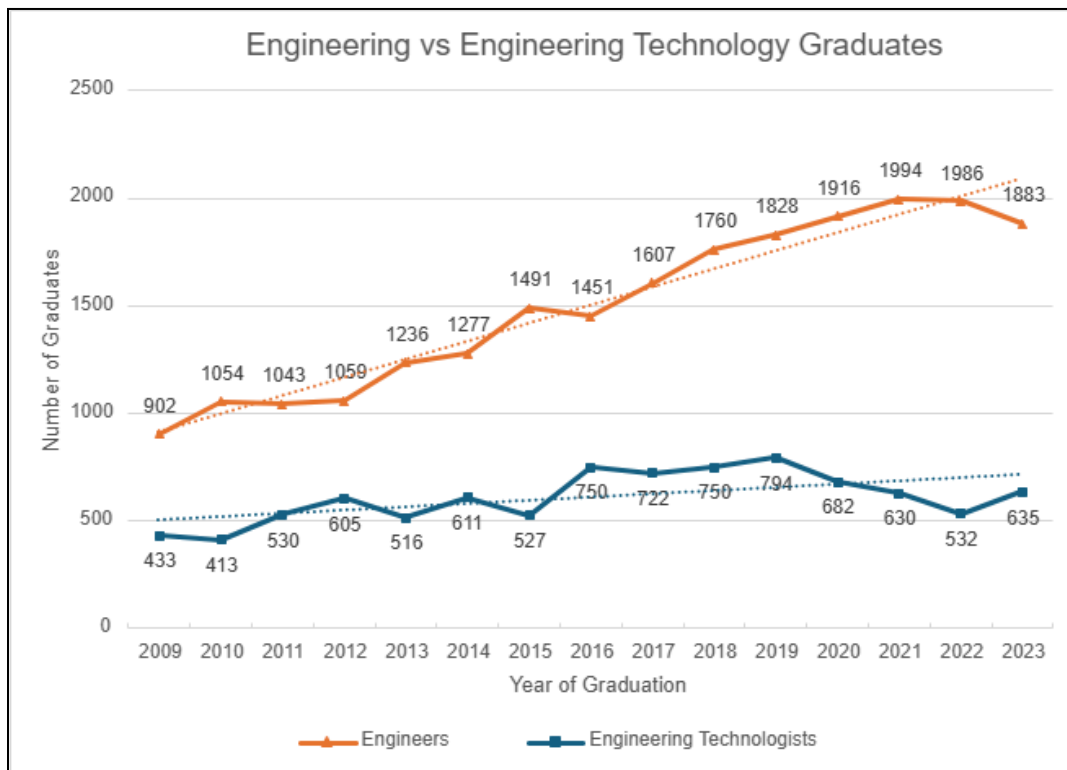
in Appendices A and B. Of the 25 public postsecondary institutions, 11 are actively involved in producing engineering and engineering technology graduates.

This study examines the actual output of graduates, not the capacity of the public post-secondary educational system in BC. It is important to note that the graduate numbers shown in this study include both domestic and international students.

## Trends

Three important trends are apparent, as shown in Figure 1:

- 1) Output of engineering graduates has been steadily increasing at a fairly constant rate over the period studied, averaging an increase of 84 graduates per annum.
- 2) Output of engineering technology graduates has been increasing at a slower rate over the period studied, averaging an increase of 15 graduates per annum.
- 3) The historic ratio of engineering graduates to engineering technology graduates is thus increasing, from about 2:1 in 2009 to 3:1 in 2023. This is counter to the “rule of thumb” of needing two or three engineering technologists for every engineer.



**Figure 1: Comparison of Engineering and Engineering Technology Graduates**

## Effect of Engineering Bridge Programs

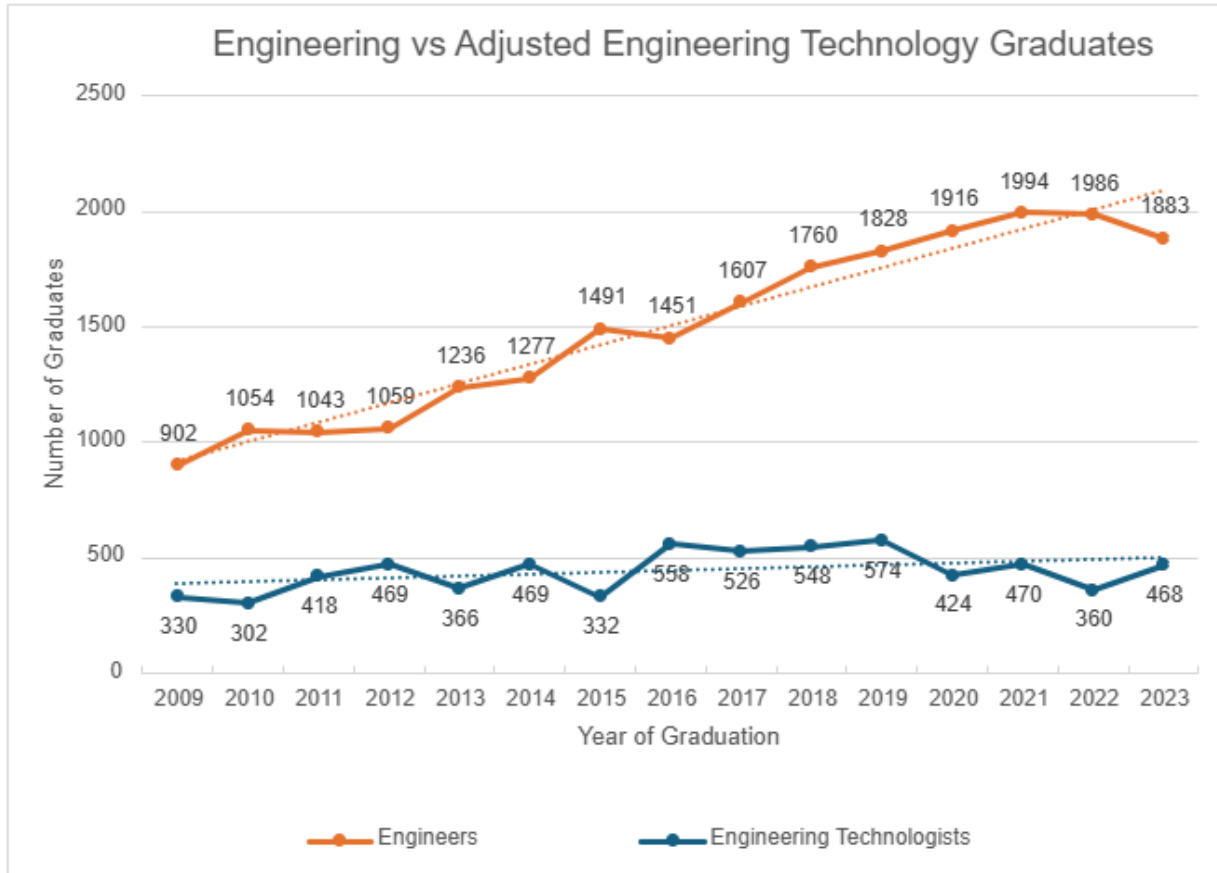
There is another factor that continues to affect the output of engineering technologists within the province, namely the growth of programs that allow engineering technology graduates to continue on to become engineers. These programs are primarily offered at BCIT, Camosun College and Okanagan College, and are directly connected to engineering schools at the University of British Columbia (both Vancouver and Okanagan) and the University of Victoria. BCIT in particular, and Camosun and Okanagan to a lesser extent, actively recruit students into engineering technology programs with the premise that this can be a route to gaining an engineering degree. Lakehead University in Ontario also recruits graduates from engineering technology programs from across Canada to continue on into the Lakehead University engineering program and is a significant recruiter of BC engineering technology graduates.

While only the top percentage in terms of GPA of a graduating class of an engineering technology program (typically civil, electrical and mechanical) will be qualified for entry into an engineering bridge program, this pathway has been significant in terms of effectively reducing the number of engineering technologists who actually enter the workforce as engineering technologists. The number of students taking advantage of this pathway has roughly amounted to a quarter of the engineering technology graduates each year over the fifteen year period of this study.

Thus the calculation of “adjusted engineering technology graduates”, in which those technologists who continue on to engineering degrees are removed from the overall engineering technology graduation numbers, is a better measure of the true output of engineering technologists in terms of practitioners entering the workforce. Using this measure, the number of engineering technology graduates still shows growth over the period of this study, but at a slightly slower rate with an increase of eight graduates per annum. As noted, typically about a quarter of the engineering technology graduates feed into engineering programs, so about 75% of the engineering technology graduates actually enter the workforce as technologists. This impact is shown in Figure 2.

The ratio of engineering graduates to engineering technology graduates is significantly impacted, from about 3:1 in 2009 to 4:1 in 2023

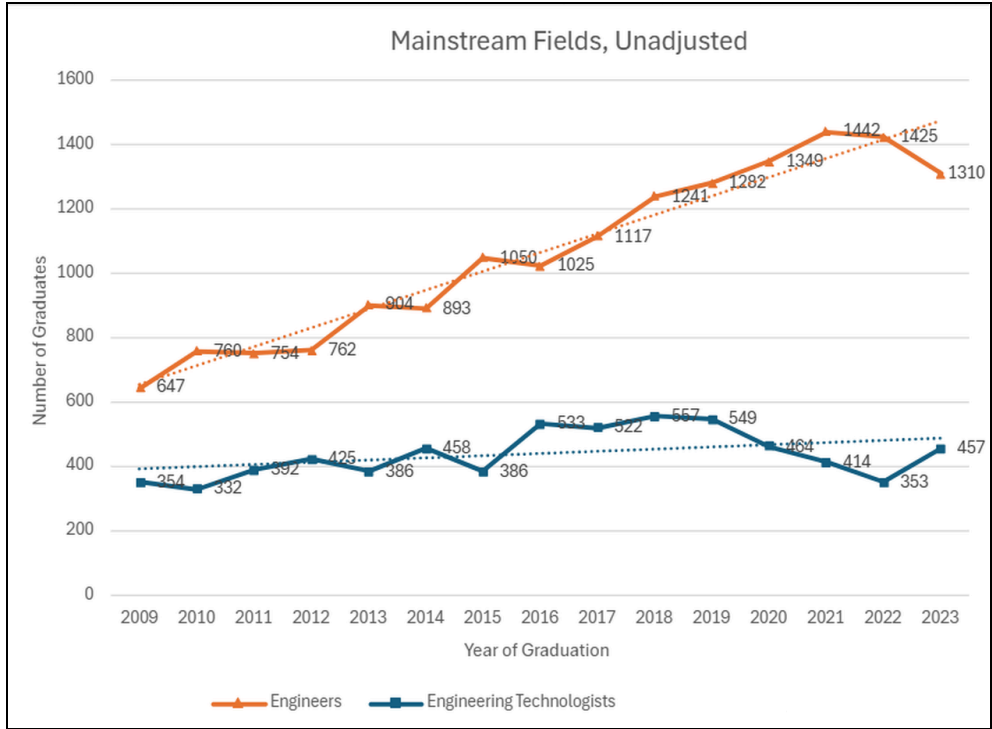




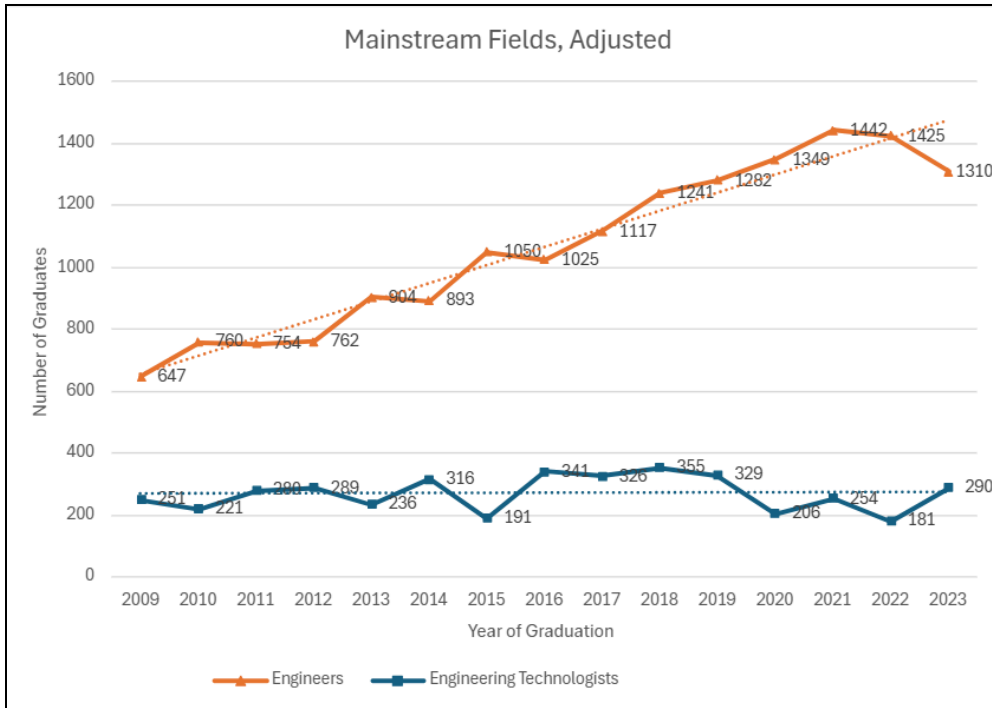
**Figure 2: Comparison of Engineering and Engineering Technology Graduates, with adjustment made for engineering technology graduates who continue on into engineering degree programs**

## Mainstream Field Analysis

In engineering and engineering technology, there are several fields that one would consider the bread and butter of practitioners, namely civil, electrical, mechanical/manufacturing and more recently computing engineering. The programs that provide routes for engineering technologists to move into engineering education are primarily focussed on these fields of study. When the study is narrowed to only include these disciplines, an interesting picture emerges. Engineering production is still good, increasing at a rate of 58 graduates each year. However, when one examines the adjusted engineering technologist data (removing engineering technology graduates who continue on to attain engineering degrees from the engineering technologist output), there has been very little growth over the period studied, as shown in Figures 3 and 4.



**Figure 3: Civil, Electrical, Mechanical/Manufacturing, Computer Engineering Total Graduates**



**Figure 4: Civil, Electrical, Mechanical/Manufacturing, Computer Engineering Adjusted Graduates**



So we can see that engineering production has increased by 102% over the period studied while engineering technology production has increased by only 15% over the same period.

## Engineering to Engineering Technologist Ratios

As stated in *Engineering and Applied Science Technology Education is Critical to BC Communities and the Economy*, “Typically industry requires 2-3 and possibly more engineering technologists per engineer; which varies depending on the field and form of the business and style.”<sup>1</sup> Thus one might expect that engineering technologist production would significantly surpass the production of engineers, but the opposite is true. While many years ago, engineering technologist production was similar to or exceeded engineer production, the period of this study indicates that the gap between graduation rates of engineers and engineering technologists continues to widen. In terms of all disciplines, the ratio of engineers to technologists in 2022 reached a high point of 5.5 engineering to engineering technology graduates (adjusted for engineering technologists continuing into engineering programs), and for the mainstream fields the ratio was even higher at 7.9 engineers for every engineering technology graduate.

## Key Points, All Disciplines

- 1) engineering graduate numbers have increased by 83.9 students each year from 2009 to 2023.
- 2) engineering technology graduate numbers have increased by 15.2 students each year from 2009 to 2023.
- 3) when engineering technology graduate numbers are adjusted to remove graduates who continued on to attain an engineering degree, it shows that engineering technology graduate numbers have increased by only 8.5 students each year from 2009 to 2023.
- 4) on a percentage basis, engineering graduates have grown much more significantly at 109% while engineering technology graduates have grown by 42% over the fifteen year period of this study.
- 5) The ratio of engineering to engineering technology graduates continues to widen, with approximately five times the number of engineers to engineering technologists being produced in 2023.

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<sup>1</sup> Engineering and Applied Science Technology Education is Critical to BC Communities and the Economy, Part 1 in a Series on BC's Engineering Technology Education, by Technology Professions BC <https://techprobc.org/techtalent-bc> April 2, 2026



## Other Considerations

This study shows one piece of a larger picture - simply the output from BC public colleges, institutes and universities. This study cannot ascertain where the graduates have chosen to work: some may leave the province for other parts of Canada, some may leave Canada to work internationally, and some may choose not to work as engineering technologists or engineers. The study does not account for migration into or out of BC both from other provinces or internationally, whether new graduates or seasoned professionals.

One must also account for the following to determine if there are sufficient engineering and engineering technology graduates being produced to meet the needs of industry now and into the future for British Columbia:

- 1) Field of study (e.g. the need for civil engineers or civil engineering technologists may be quite different than for, say, mechanical engineers or mechanical engineering technologists).
- 2) Level of experience (e.g. does industry need more senior level practitioners or can entry level practitioners fill current and future demand).
- 3) Changes in technology, including artificial intelligence (AI) and the impact of AI on industry. It is uncertain what the future will require in terms of quantities of engineers and engineering technologists. There could be shifts in the demand for certain fields of study compared to past and current trends.
- 4) Retirement effect. The age demographics of the engineering and engineering technology workforce can significantly impact current and future demand.
- 5) Upward mobility. Engineers and engineering technologists often move up into intermediate and senior management positions, taking them away from the more technical work of these practitioners.

## Key Questions

The trends noted above require assessment of other factors in order to determine the significance of these trends. While the much slower growth of engineering technology graduates may seem to be a cause for alarm at first glance, it needs to be cross-referenced with other data to determine if it is truly a concern. Thus, the following questions need to be considered:

- 1) Are the graduation rates of engineers meeting provincial demand?
- 2) Are the graduation rates of engineering technologists meeting provincial demand?
- 3) Is the historical ratio of engineers to engineering technologists shifting to require fewer technologists - could this be an outcome of higher levels of software and AI being used in the workplace?



- 4) With advances in technology, are employers needing fewer technologists than in the past, such that engineers now routinely complete work that traditionally was the domain of engineering technologists? Alternatively, is this an outcome of a lack of focus on engineering technology programs throughout the province, resulting in the continued divergence between engineering and engineering technology graduates?
- 5) What is the net migration of engineers in/out of BC annually?
- 6) What is the net migration of engineering technologists in/out of BC annually?
- 7) How does the supply of engineers and engineering technologists compare to the employment growth in the province?

## Caveats

The data does not delineate between domestic and international students. As such, it does not assess the impact of international graduates who return to their home countries to work upon graduation, nor does it account for the significant growth of the international student population over the period studied. It is quite probable that there are significant international students in the mix and that a high percentage of these leave Canada after completing their education in BC. This will of course reduce the availability of new graduates (both engineers and engineering technologists) for BC employers. Further, this may be more prevalent in the university context and as a result have a greater impact on engineering undergraduate output and apparent growth.

The study does not take into consideration whether the programs considered are accredited to national standards. There are some engineering technology programs that are not currently accredited; for the purposes of this study, these programs have not been considered any differently than those that are accredited, even though the outcomes for the graduates may be somewhat different.

## Conclusions

In summary, the study has shown the following:

- Growth of engineering graduates has been steady and significant;
- Growth of engineering technologists entering the workforce, once one accounts for those that continue on for engineering degrees, has been increasing at a very slow rate;
- The mainstream fields of civil, mechanical and electrical show a stark contrast between engineering output and engineering technology graduate output, the latter showing almost no growth over the period studied.



## Future Studies

To provide greater value and veracity, further studies are needed as follows:

- Separate out international student graduates from domestic student graduates;
- Determine the net migration of each group into and out of the province;
- Determine the rate at which each group is leaving the workforce either to retirement or taking on non-engineering work (e.g. senior management positions);
- Compare the actual output to actual program capacity to determine how much latency is currently available; and
- Survey industry to ascertain if needs are being met, both at entry level positions and more experienced positions.



# Appendix A

## B.C. Institutions with Engineering Technology Programs

- British Columbia Institute of Technology
- Camosun College
- College of New Caledonia
- Okanagan College
- Thomson Rivers University
- University of the Fraser Valley
- Vancouver Community College

## B.C. Institutions with Engineering Degree Programs (full four-year undergraduate)

- British Columbia Institute of Technology
- Simon Fraser University
- University of British Columbia
- University of Northern British Columbia
- University of Victoria

# Appendix B

## Data Sources

- Statistics Canada. Table 37-10-0278-03 University graduates by detailed field of study, institution, and program and student characteristics
- Statistics Canada. Table 37-10-0278-02 College graduates by detailed field of study, institution, and program and student characteristics
- BCIT Institutional Research
- Camosun College Institutional Research and Planning
- Lakehead University Engineering Dean's Office
- Okanagan College Office of the Registrar
- Simon Fraser University Institutional Research and Planning
- Thomson Rivers University Trades and Technology Dean's Office
- University of British Columbia School of Engineering
- University of Victoria Engineering Undergraduate Office
- Vancouver Community College Dean's Office



## About Hay Leadership Consulting

Andrew Hay, Ph.D., LSME, P.Eng (ret) of Hay Leadership Consulting authored this report. Dr. Hay has held senior positions at both Okanagan University College (Dean of Engineering Technologies) and Okanagan College (Provost and Vice President Academic). Having taught both engineering at the University of Alberta and engineering technology at NAIT and Okanagan University College, he has a strong background in engineering education. He was a member of BC's Quality Audit and Assessment Committee and has often been an external expert for degree quality assessments for Campus Alberta Quality Council. As a retired professional engineer and honorary member of Applied Science Technologists and Technicians of BC, he has maintained a strong interest in both engineering and engineering technology education within the Canadian context.

