Major Trends in Alberta's Post-Secondary Training Capacity

Alberta Post-Secondary Network
2023

pwc

Contents

1. Executive summary 3

2. PSI capacity and labour needs in Alberta 7

3. Labour needs in key occupations 10

Appendices 27

1

Executive summary

This report highlights major trends in post-secondary capacity in Alberta

PricewaterhouseCoopers LLP (“PwC”) was commissioned by the Alberta Post-Secondary Network (“APSN”) to perform an analysis of postsecondary capacity in Alberta.

The APSN brings together 26 presidents from post-secondary institutions (“PSIs”) across the province of Alberta with an aim of building a world class post-secondary system and student experience that drives discovery, creativity and innovation in the province.

In this report we:

- Provide an overview of the future of Alberta’s labour market including anticipated labour imbalances in key occupational categories;
- Outline the province's post-secondary supply and demand dynamics and trends based on application, enrollment and completion data from APSN member institutions; and
- Compare historical trends in post-secondary system capacity across programs that provide training for key occupations versus future projections on provincial labour market needs.

The findings of this report are aimed to enable APSN to develop a deeper understanding of the trends and capacity limitations within the Alberta PSI system. It also aims to help them to consider how member institutions can work to address anticipated labour market imbalances within Alberta across key occupations. Limitations associated with this document are detailed in **Appendix A**.

For a list of all APSN members by institution type, refer to **Appendix B**.

Key Findings: Alberta’s Labour Needs

Alberta is facing growing labour shortages

- Alberta is expected to face growing labour shortages. The **total number of job openings is anticipated to exceed the number of job seekers** by around 33,000 in 2025 and 46,000 by 2030.
- The shortage will be driven by **retirements, growth in select industries and insufficient new supply** through training and immigration.
- Occupations with **the greatest shortages are found in areas of health, education, construction and trades, computer programming, engineering and office workers,** with a gross shortage of 107,000 job openings on a cumulative basis by 2030. Some of these shortages will be offset by surpluses in other occupations such as retail and food services.

But enrollment in Alberta’s PSIs has not grown, despite greater demand for places

- **Total enrollments across Alberta’s PSIs have remained relatively stable over the past ten years**, with enrollment numbers in 2021/22 virtually the same as in 2012/13 at 270,000 students.
- **Applications to Albertan PSIs have risen steadily, increasing by 22.8% between 2012/13 and 2019/20.** Even with the one-off effects of COVID-19, growth in applications has significantly outstripped enrollments.
- Across all programs, **completions in Alberta have increased by 10% between 2012/13 and 2021/22.**

This report also evaluates capacity trends across programs providing training for major occupations facing labour shortages in Alberta

The report focuses on six occupational categories where the labour shortages are projected to be the most acute between now and 2030. For each, we evaluate the PSI programs that lead to these occupations and explore trends in these programs at the 26 APSN member institutions.

Category	Key findings	Key occupations facing labour shortages
Office work	• Office work occupations (listed to the right) are anticipated to face a **cumulative labour shortage of almost 53,000 jobs between 2021 and 2030 in Alberta** • But over much of the past ten years, enrollments in the programs that lead to these occupations **have been flat or declining**. Only in 2021/22 did enrolment exceed 2012/13 levels and it remains to be seen whether this is reflective of a one-off bounce back effect of COVID-19.	• **General office support workers** • **Receptionists** • **Accounting and related clerks** • **Payroll clerks**
Construction and trades	• A number of important construction and trades occupations are seeing rising labour shortages, with the three roles listed to the right expected to face a cumulative labour shortage of **about 21,000 jobs between 2021 and 2030.** • An important driver of this is the decline in enrollments which have **fallen by 45% between 2012/13 and 2021/22.** Fewer students are applying to these programs, **but the decline is far less at 19% over the same period.** Given the critical role of these professions in developing the large infrastructure projects required in order to achieve Alberta's economic goals (e.g. net zero), this may suggest that PSIs should make it a priority and attract more students to these programs to increase their profile and attractiveness.	• **Home building and renovation managers** • **Contractors and supervisors, installers, repairers and servicers** • **Construction trades helpers and labourers**
Health	• Rising labour shortages are also affecting the health sector, notably the three nursing and support occupations listed to the right. These occupations are anticipated to face a cumulative labour shortage, **totalling over 11,000 jobs** between 2021 and 2030. • Applications for the programs leading to these jobs have surged. They have been **21% - 36% up on 2012/13 levels over the last five years**. But enrollments have grown modestly having been generally up by **between 4% - 7% over 2012/13 levels.** A jump in enrollment in 2021/22 has narrowed the gap with applications which is promising, but it remains to be seen whether this is a sustained trend or a one-off post-pandemic affect.	• **Registered nurses and registered psychiatric nurses** • **Licensed practical nurses** • **Nurse aides, orderlies and patient service associates**

This report also evaluates capacity trends across programs providing training for major occupations facing labour shortages in Alberta

Category	Key findings	Key occupations facing labour shortages
Computer programming	• Computer programming occupations (highlighted to the right) are anticipated to face a cumulative labour shortage of **7,500 jobs between 2021 and 2030**. • These occupations and the programs leading to them have been in high demand. Since 2012/13 applications for programs leading to these roles has **increased almost three and half times**. Enrollments have also shown a positive trend increasing **almost two and a half times** over the same period**.** • The greater growth in applications suggests there are students available to meet these labour shortages if more capacity is provided in the PSI system. Additionally, the data shows there are a large number of students who are qualified for programs but do not receive an offer, suggesting PSIs are managing capacity constraints. In 2021/22 there were 7,955 qualified applicants for programs that lead to these roles but only 5,455 offers extended.	• **Information systems analysts and consultants** • **Computer programmers and interactive media developers**
Education	• Teaching assistant roles are expected to see the most acute labour shortages in the education sector. They are anticipated to face a cumulative labour shortage of **over 3,400 jobs between 2021 and 2030.** • Over the past ten years, growth applications for programs leading to these jobs **have risen by 49%, while enrollment has only increased by 28%**. This suggests there are students available to meet these labour shortages if capacity is available in the PSI system	• **Elementary and secondary school teacher assistants**
Engineering	• Petroleum engineers are expected to face the greatest labour shortages within the engineering category and are expected to face a cumulative labour shortage of over **3,300 jobs between 2021 and 2030.** • Trends in the programs leading to this occupation tend to show some cyclicality over time, linked to the performance of the oil and gas industry, but overall **applications rose by 11% from 2012/13 to 2021/22, while enrolments fell by 10%.** This suggests there is an opportunity to grow system capacity to address these labour shortages.	• **Petroleum engineers**

2

PSI capacity and labour needs in Alberta

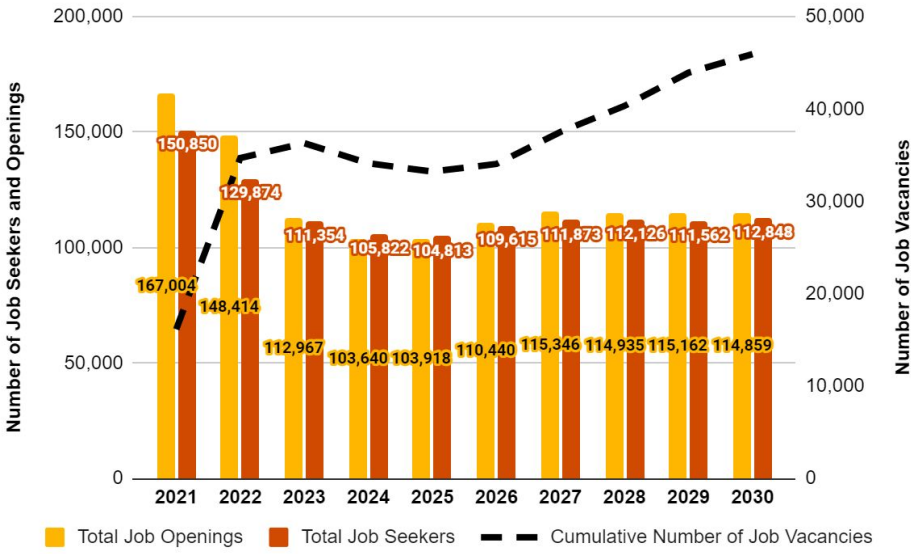
In this section we present data on aggregate trends in Alberta’s labour market and PSI enrollment.

Despite rising labour shortages enrollment has been dropping, reducing the capacity of the province to train workers with post-secondary qualifications.

Alberta is projected to face an increasing labour shortage through the 2020s

- The Government of Alberta's labour market projections in "Alberta's Occupational Outlook" show the Province is expected to face a rising labour shortage between 2021 and 2030, with the total number of job openings anticipated to exceed the number of job seekers by around 33,000 in 2025 and 46,000 by 2030 (shown by the dotted line on the chart).
- These figures are on a net basis and large shortages in some occupations are partly offset by surpluses in others such as retail and food services.
- Rising labour shortages are a relatively new trend. The previous edition of the Occupational Outlook predicted that the provincial labour market would be approximately in balance (with an overall labour shortage of just 500 workers by 2028).
- The shortage is primarily driven by the need to replace workers who are due to retire in the near future and a mismatch between skill supply and demand, as major trends such as the transition to net zero are anticipated to alter the skills needed in an economy.
- Shortages are expected across a range of occupations including office workers, construction and trades, health, computer programming, education and engineering.

Alberta labour market total job seekers, openings and cumulative vacancies forecast, 2021 - 2030



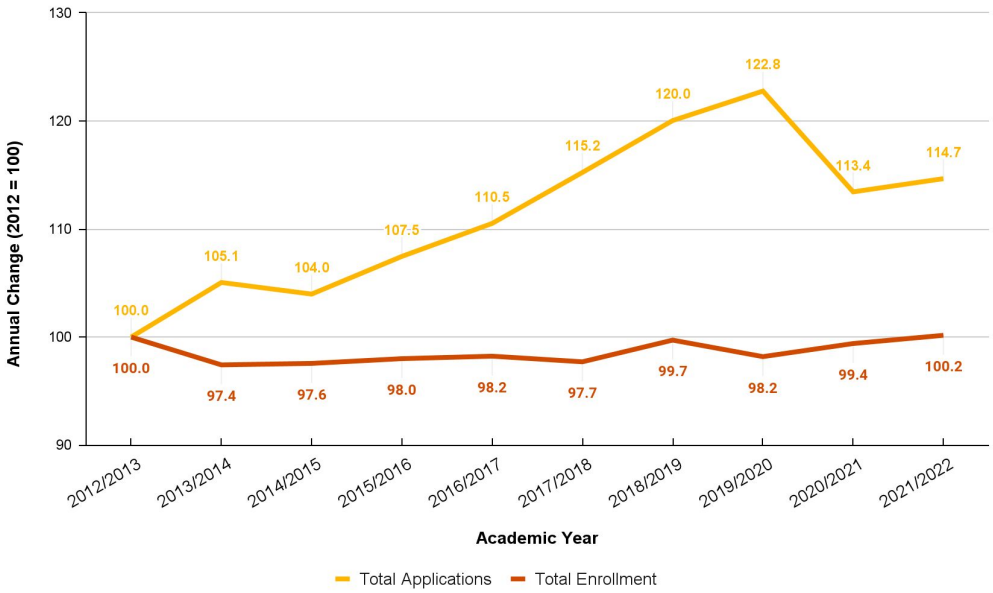
Source: PwC Analysis based on data from Government of Alberta, "Alberta's Occupational Outlook 2021 - 2030"

Rising labour shortages come over a period when enrollment in Alberta's PSIs have been flat, despite the increase in applications

- The chart to the right depicts trends in student enrollments and applications across the Alberta PSI system over the last ten years. The figures are indexed to 100 in 2012/13 in order to clearly illustrate the trends over time.
- Total enrollments across Alberta's PSIs have remained relatively stable over the period with enrollment numbers in 2021/22 at 270,000, virtually the same as in 2012/13. This is despite Alberta's population and GDP increasing by 17% and 7% respectively over this period.*
- Applications on the other hand rose steadily, increasing by 22.8% between 2012/13 and 2019/20 indicating that Alberta's PSIs are in demand from both domestic and international students. Applications dropped somewhat over the last two years of data, in part due to COVID-19 and many PSIs providing prospective students with the option to defer their applications. Even with these one-off COVID-19 effects, application growth has significantly outstripped enrollments.
- More recently between 2017 and 2022, the Ministry of Advanced Education operating expenditures including funding allocated toward Alberta PSIs has decreased by over 6%.**

** Source: Statistics Canada Table 17-10-0009-01 and Table 36-10-0402-01.*
*** Source: PwC Analysis based on data from Government Alberta, "Alberta Budget Fiscal Plan Tables"*

Alberta PSI System applications and new enrollments, 2012/13 - 2021/22



Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

3

Labour needs in key occupations

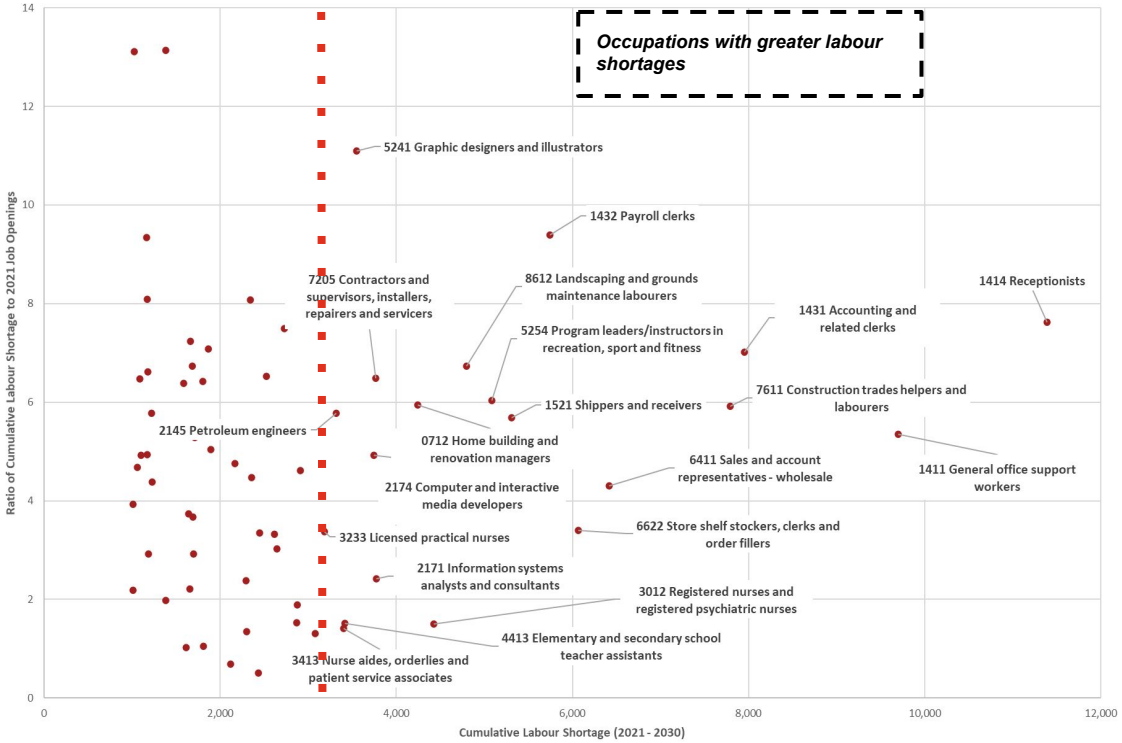
Having presented the aggregate trends in the preceding section, we now focus in more detail on trends in specific occupations where labour shortages are more acute.

We highlight which occupations these are and the trends in enrollment in the programs people working in these jobs tend to study.

Labour shortages are expected to be unevenly distributed, with office, construction, healthcare, technology, and education staff most affected

- The chart to the right provides a breakdown of labour shortages by occupational group. We have measured this in two ways:
  - **On the horizontal axis**, the total labour shortage is shown (defined as the number of net cumulative job vacancies). Occupations toward the right are those which have the greatest need of new workers in terms of numbers alone.
  - **On the vertical axis,** a measure of job shortage intensity is shown. A given labour shortfall will have a greater impact on an occupation with fewer positions than one with more. To measure this, the ratio is taken between occupation-specific projected cumulative labour shortages and current job openings. The occupations at the top are deemed to have a more acute shortage.
- For a list of the top 20 occupations forecasted to face labour shortages in Alberta, refer to **Appendix C**.

Cumulative forecasted labour shortages (horizontal axis) and intensity of shortages (vertical axis) in Alberta, 2021 - 2030



Source: PwC Analysis based on data from Government of Alberta, "Alberta's Occupational Outlook 2021 - 2030"

The remainder of this section focuses on trends in training programs for people who tend to work in occupations with the largest labour shortages

- In the remainder of this section, we focus on those occupations that have the largest labour shortages (i.e. those towards the right of the chart on the previous page).
- We list these occupations in the table opposite. For each we have analysed the typical post-secondary education credentials held by individuals who currently work in these roles, which are shown in the rightmost column of the table.
- In addition, we review trends in applications and enrollments for these programs, which represent a key source of labour supply for occupations with labour shortages.
- For a detailed breakdown of historical applications and enrollments for post-secondary programs included each occupational group, refer to **Appendix D**.
- For a detailed breakdown of program-specific Alberta PSI System capacity metrics included in each occupational group, refer to **Appendix E**.

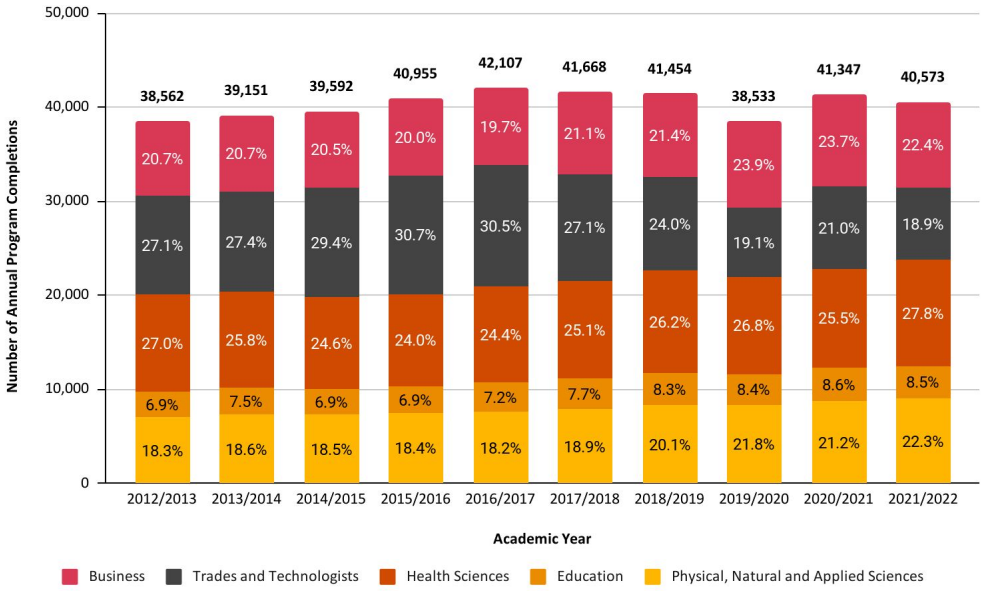
Occupations in Alberta forecasted to face the largest labour shortages and relevant post-secondary programs training staff for these occupations

Category	Occupations (and National Occupations Classification codes)	Most relevant post-secondary programs (and Classification of Instructional Program codes)
Office workers	*1411 General office support workers* *1414 Receptionists* *1431 Accounting and related clerks* *1432 Payroll clerks*	• 52.01 Business/commerce, general • 52.02 Business administration, management and operations • 52.03 Accounting and related services • 52.04 Business operations support and assistant services • 52.10 Human resources management and services
Construction and trades	*0712 Home building and renovation managers* *7205 Contractors and supervisors, other construction trades, installers, repairers and servicers* *7611 Construction trades helpers and labourers*	• 46.02 Carpentry/carpenter • 46.03 Electrical and power transmission installers • 46.04 Building/construction finishing, management and inspection • 46.05 Plumbing and related water supply services • 48.05 Precision metal working
Health	*3012 Registered nurses and registered psychiatric nurses* *3233 Licensed practical nurses* *3413 Nurse aides, orderlies and patient service associates*	• 51.07 Health and medical administrative services • 51.26 Health aides/attendants/orderlies • 51.38 Registered nursing, nursing administration, nursing research and clinical nursing • 51.39 Practical nursing, vocational nursing and nursing assistants
Computer programming	*2171 Information systems analysts and consultants* *2174 Computer programmers and interactive media developers*	• 11.01 Computer and information sciences and support services, general • 11.02 Computer programming • 11.07 Computer science • 11.08 Computer software and media applications
Education	*4413 Elementary and secondary school teacher assistants*	• 13.01 Education, general • 13.15 Teaching assistants/aides • 19.07 Human development, family studies and related services
Engineering	*2145 Petroleum engineers*	• 14.01 General engineering • 14.07 Chemical engineering • 14.19 Mechanical engineering • 48.05 Precision metal working

Program completions in these categories from Alberta's PSIs have been broadly flat over the past 10 years, but the program mix is shifting

- The chart to the right details the number of system-wide completions for selected programs (as listed on the previous page) within Alberta between 2012/13 and 2021/22. As noted before, these programs all feed into occupations with the largest expected labour shortages.
- Across the highlighted program bands, completions in Alberta have changed very little, with a moderate increase in numbers since 2012/13.
- The program mix has shifted with completions up in Education by 29%, Physical, Natural and Applied Sciences by 28%. Trades and Technologist-related programs have experienced a decline in completions, with 2021/2022 levels 27% below those in 2012/2013.
- Across all major program bands including those highlighted, total completions have increased by 9% since 2012/13, or the equivalent of 10,000 additional completions.

Alberta PSI System completions by selected program bands, 2012/13 - 2021/22



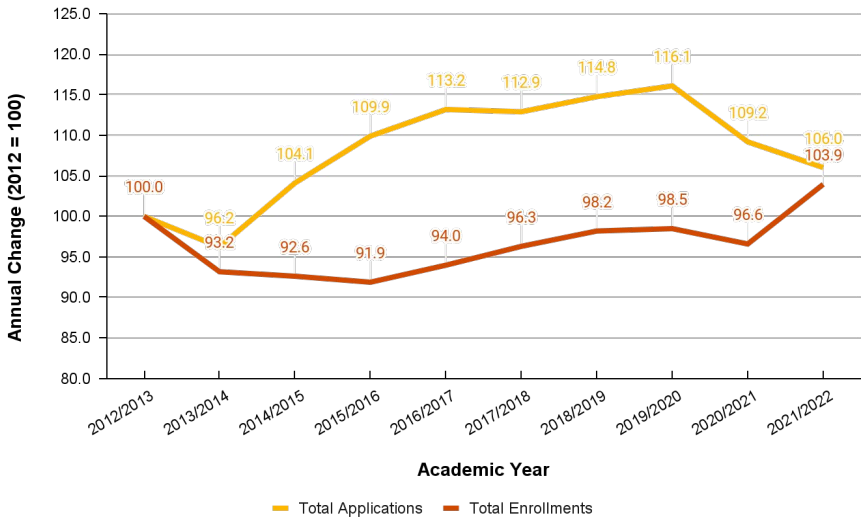
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System"

** We note that the program bands as defined by the Government of Alberta are based on an aggregation of Classification of Instructional Programs ("CIP") categories into broad groupings. For more information, refer to: https://open.alberta.ca/opendata/system-wide-program-completions-within-the-alberta-post-secondary-education-system*

Office workers: application growth has generally outpaced enrollments, despite a recent post-COVID enrollment uptick

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/2013 and 2021/2022 Academic Years for programs that commonly lead to office work occupations. These are the aggregate figures for the programs listed in the table below.
- System-wide applications and enrollments have largely comprised of programs that focus on management and operations. General business and accounting programs have also accounted for large shares of both applications and enrollments.
- Over the past ten years, growth in total applications tended to outpace growth in enrollments for these programs until 2019/2020. This suggests that enrollments capacity has not been responsive to rising demand for programs, which is one reason that labour shortages in these occupations are increasing.
- While the 2021/22 period has closed the gap, it remains to be seen how much of this is reflective of a one-off COVID effect.
- Across Alberta, the four main occupations linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling close to 53,000 jobs between 2021 and 2030.

Alberta PSI System applications and enrollments for programs related to office worker occupations, 2012-2022



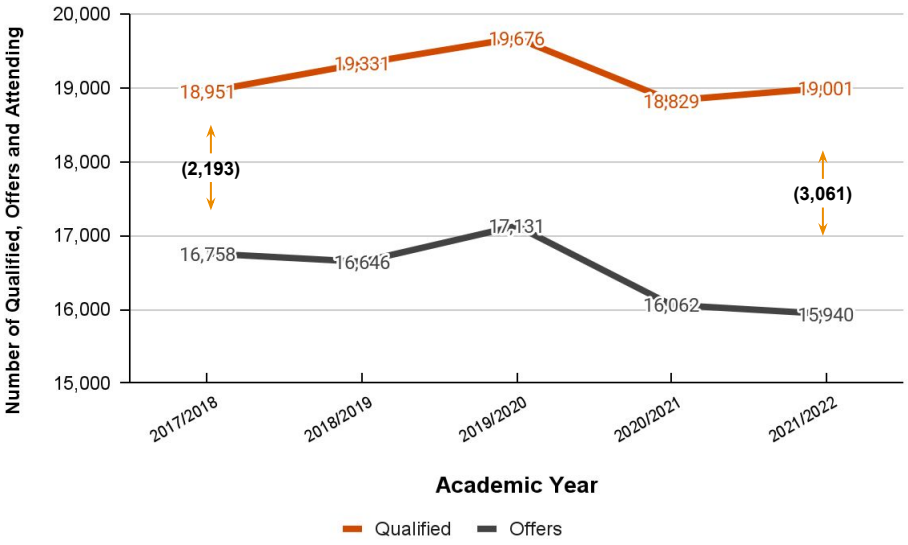
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
1411 General office support workers	• 52.01 Business/commerce, general
1414 Receptionists	• 52.02 Business administration, management and operations
1431 Accounting and related clerks	• 52.03 Accounting and related services
1432 Payroll clerks	• 52.04 Business operations support and assistant services
	• 52.10 Human resources management and services

Office workers: the number of qualified applicants has been flat, but fewer offers are being made

- The chart opposite details application data on the highlighted programs which commonly lead to office work occupations. It shows the number of qualified applicants and offers sent between 2017/18 and 2021/22.
- The total number of students who qualify for these programs has largely remained unchanged over this period but the number of offers sent out have declined by 5%. There were around 2,200 qualified students who did not receive an offer in 2017/18, which rose to over 3,000 by 2021/22 - potentially due to capacity constraints in the system.
- Over the past five years, there have been declines in the number of qualified applicants and offers sent for these programs. The largest decreases have been in:
  - Accounting programs, with qualified applicants and offers sent declining by 20% and 22%, respectively.
  - Human resources management programs, with qualified applicants and offers sent declining by 13% and 16%, respectively.
  - While most other programs have experienced declines during this period, general business programs have had an uptick in the number qualified applicants (32%) and offers sent out (10%).

Alberta PSI System qualified applicants and offers sent for programs related to office worker occupations, 2017-2022



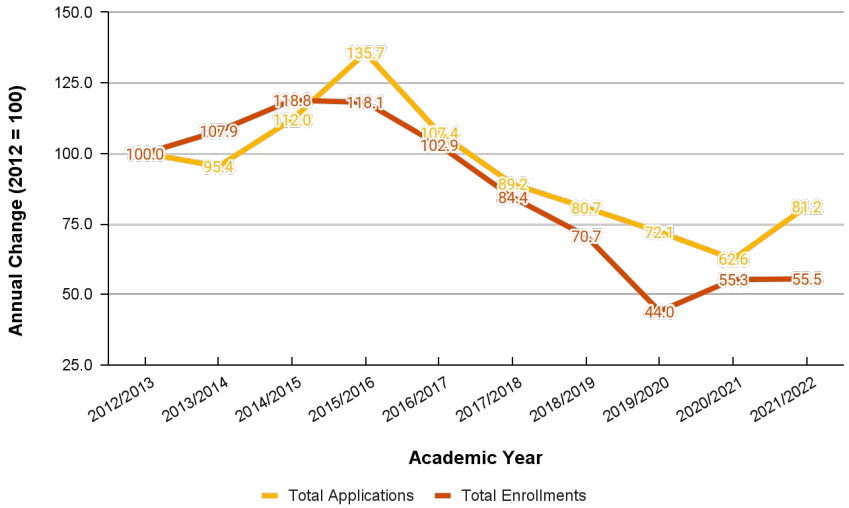
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Construction and trades: enrollments have fallen by 45% despite applications only dropping by 19%, exacerbating labour shortages

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/13 and 2021/22 Academic Years for programs that generally lead to construction and trades occupations. These are the aggregate figures for the programs listed in the table and consist only of students applying to pre-apprenticeship programs as formal trades training is administered by Apprenticeship and Industry Training ("AIT") and not directly through PSIs.
- System-wide applications and enrollments have largely comprised of electrical installation and precision metal working. Plumbing and carpentry programs combined have also accounted for a large share of both applications and enrollments.
- Since 2015/16 both total applications and enrollments have largely been on downward trends - but the decline in enrollments have been far greater. Given the critical role of these professions in developing the large infrastructure projects required in order to achieve Alberta's economic goals (e.g. net zero), this may suggest that PSIs should make it a priority to rebrand these professions in order to increase their profile and attractiveness.
- Across Alberta, the three main occupations linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling approximately 20,600 jobs between 2021 and 2030.

We note that due to data limitations, information on annual system-wide applicants for **46.04 Building/construction finishing, management and inspection was unavailable from ASI.*

Alberta PSI System applications and enrollments for programs related to construction and trades occupations, 2012-2022*



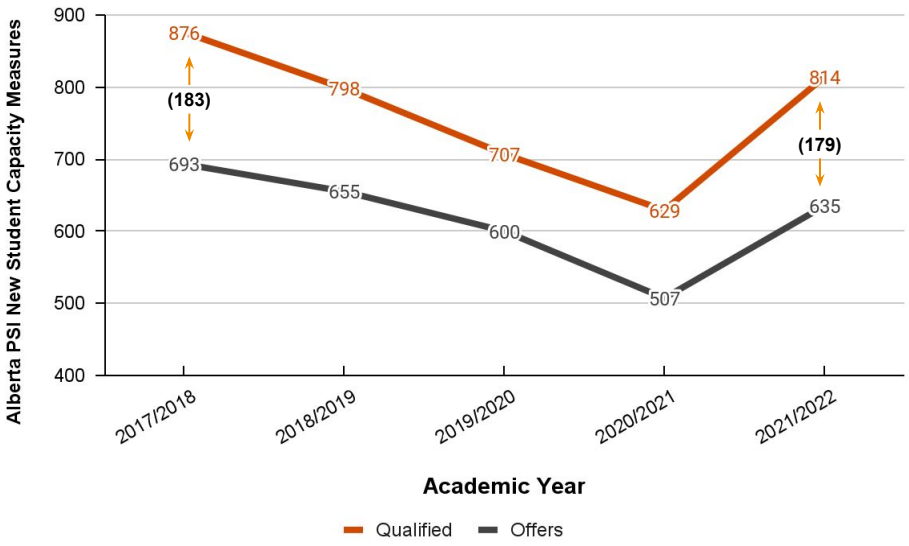
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
0712 Home building and renovation managers	• 46.02 - Carpentry/carpenter • 46.03 - Electrical and power transmission installers • 46.04 Building/construction finishing, management and inspection • 46.05 - Plumbing and related water supply services • 48.05 - Precision metal working
7205 Contractors and supervisors, installers, repairers and servicers	
7611 Construction trades helpers and labourers	

Construction and trades: the number of qualified applicants and offers sent have declined since 2017/18

- The chart opposite details application data on the highlighted programs which commonly lead to construction and trades occupations. It shows the number of qualified applicants and offers sent between 2017/18 and 2021/22. These figures consist only of students applying to pre-apprenticeship programs given those looking to gain formal trades training are required to apply to AIT and not directly to PSIs.
- As illustrated in the chart, generally 80%-85% of qualified students are receiving an offer suggesting that the large difference in trends for applications and enrollments shown on the previous page may either be down to lower applicant quality or more stringent requirements.
- Over the past five years, electrical installation programs have experienced large declines in the number of qualified applicants and offers sent, with declines of 18% and 28%, respectively. However, during this same period, plumbing programs have had a marked uptick in the number qualified applicants and offers sent, with increases of 24% and 22%, respectively.

Alberta PSI System qualified applicants and offers sent for programs related to construction and trades occupations, 2017-2022*



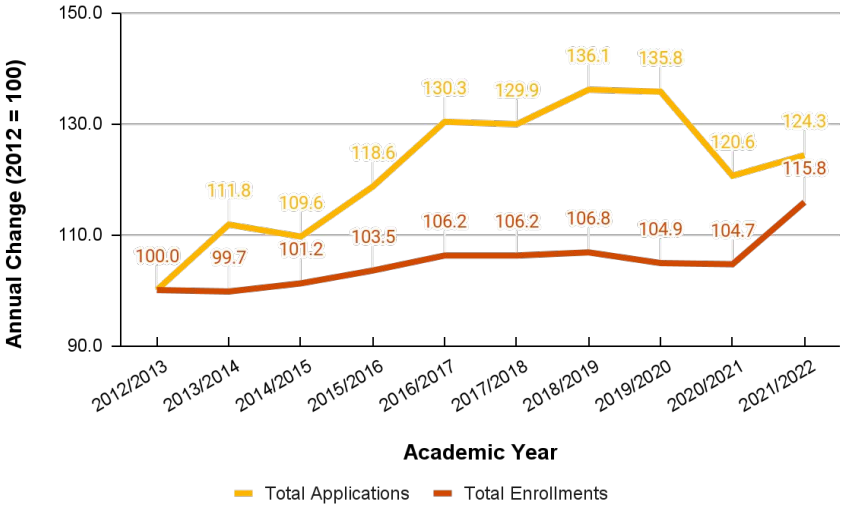
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

We note that due to data limitations, information on annual system-wide applicants for **46.04 Building/construction finishing, management and inspection was unavailable from ASI.*

Health: Much of the last decade saw soaring applications but only a small uptick in enrollment, although the pandemic led to a likely one-off boost

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/13 and 2021/22 Academic Years for programs that generally lead to health occupations with labour shortages. These are the aggregate figures for the programs listed in the table.
- System-wide applications and enrollments in this chart are largely comprised of registered and clinical nursing programs. Practical nursing, nursing assistants and healthcare administration programs have also accounted for large shares of both applications and enrollments.
- Over the past ten years, growth in total applications has outpaced growth in enrollments for these programs, with 2021/22 applications up 24% (4,000 applicants) above 2012/13 levels. Prior to the onset of COVID-19, growth in enrollments was limited and did not reflect the application surge. However in 2021/22, there was a significant uptick in enrollments for these programs. It remains to be seen if this is sustained or a one-off COVID-19 effect.
- Across Alberta, the three main occupations linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling over 11,000 jobs between 2021 and 2030.

Alberta PSI System applications and new enrollments for programs related to health occupations, 2012-2022



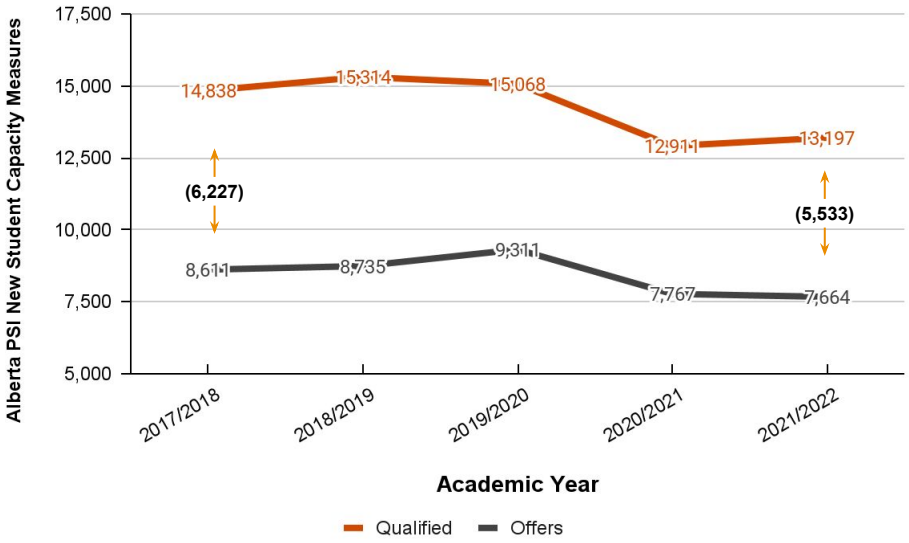
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
3012 Registered nurses and registered psychiatric nurses	• 51.07 Health and medical administrative services • 51.26 Health aides/attendants/orderlies • 51.38 Registered nursing, nursing administration, nursing research and clinical nursing • 51.39 Practical nursing, vocational nursing and nursing assistants
3233 Licensed practical nurses	
3413 Nurse aides, orderlies and patient service associates	

Health: Qualified applicants are far above the number of offers sent, suggesting that PSIs are managing capacity constraints

- The chart opposite details application data on the highlighted programs which commonly lead to health occupations. It shows the number of qualified applicants and offers sent between 2017/18 and 2021/22.
- This area stands out when compared to those previously reviewed as qualified applicants significantly exceed offers made to students, often by over 5,000 per annum or 70%-75%.
- The ratio of qualified students to offers sent out for these programs has largely remained consistent during this period. This is driven by the fact that the total number of students who qualify for these programs and also the number of offers sent have fallen by almost the same percentage (11%).
- Over the past five years, there have been declines in the number of qualified applicants and offers sent for the following programs:
  - Health and medical administrative programs, with qualified applicants, and offers sent declining by 16% and 11%, respectively.
  - Registered and clinical nursing programs with qualified applicants and offers sent declining by 14% and 15%, respectively.
  - Health aide programs with qualified applicants and offers sent declining by 3% and 11%, respectively.

Alberta PSI System qualified applicants and offers sent for programs related to health occupations, 2017-2022

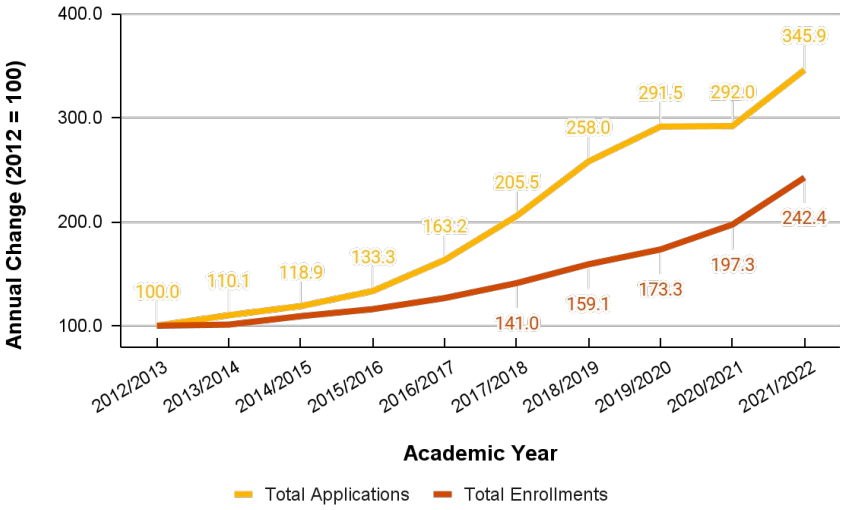


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Computer programming: demand has significantly grown, but enrollments are not keeping pace with applications or addressing tech-related labour shortages

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/13 and 2021/22 Academic Years for programs that generally lead to computer programming occupations. These are the aggregate figures for the programs listed in the table.
- System-wide applications and enrollments have largely comprised of computer science programs. General information technology, support services and software/media application programs have also accounted for large shares of both applications and enrollments.
- Over the past ten years, growth in total applications has largely outpaced growth in enrollments for these programs, with 2021/22 applications up 246% (10,000 applicants) and enrollments 142% (5,000 students) above 2012/13 levels.
- Across Alberta, the two main occupations linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling over 7,500 jobs between 2021 and 2030. This data suggests that while capacity is rising in these programs, it has not kept pace with the demand from prospective students.

Alberta PSI System applications and new enrollments for programs related to computer programming occupations, 2012-2022



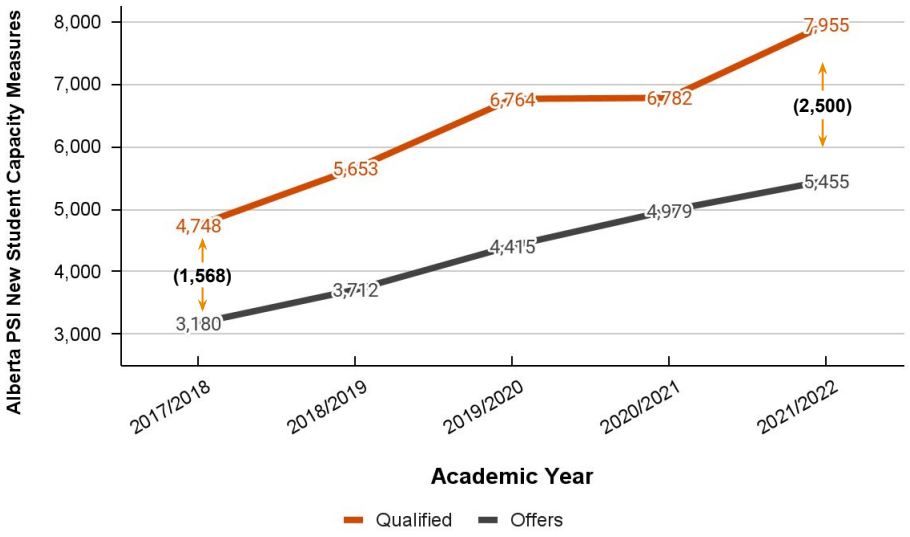
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
2171 Information systems analysts and consultants	• 11.01 Computer and information sciences and support services, general • 11.02 Computer programming • 11.07 Computer science • 11.08 Computer software and media applications
2174 Computer programmers and interactive media developers	

Computer programming: growth in the number of qualified students has outpaced offers sent

- The chart opposite details application data on the highlighted programs which commonly lead to computer programming occupations. It shows the number of qualified applicants and offers sent between 2017/18 and 2021/22.
- A key finding here is that a significant number of qualified students each year are not receiving offers (typically in the range of 1,000-1,500), which reinforces the data on the previous slide suggesting that demand is currently outstripping supply for these types of programs. This gap has been growing.
- Within individual programs there have been significant increases during this period in the number of qualified applicants and offers sent. The largest increases have been in:
  - Computer programming, with qualified applicants and offers sent increasing by 148% and 128%, respectively.
  - Software/media applications programs, with qualified applicants and offers sent increasing by 41% and 123%, respectively.

Alberta PSI System qualified applicants and offers sent for programs related to computer programming occupations, 2017-2022

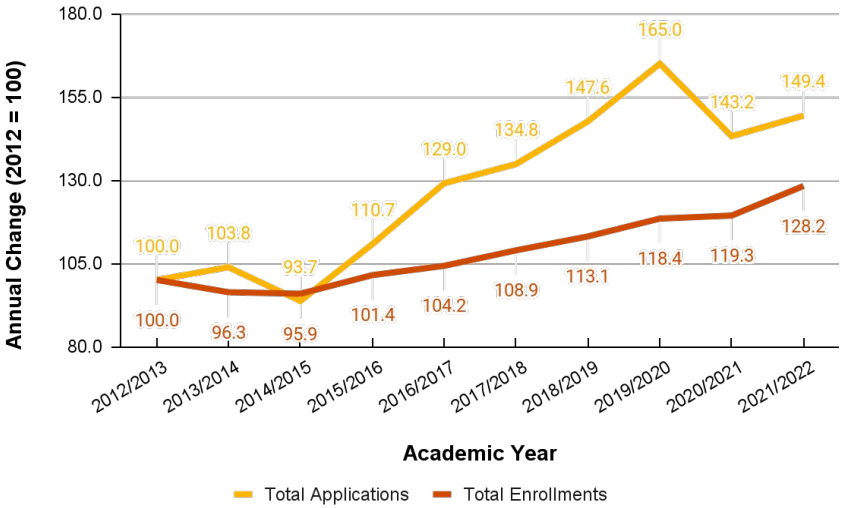


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Education: application growth has significantly outpaced enrollments suggesting unmet demand in this area with growing labour shortages

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/13 and 2021/22 Academic Years for programs that generally lead to education occupations. These are the aggregate figures for the programs listed in the table.
- System-wide applications and enrollments have largely comprised of programs focusing on human development and family studies. General education and teacher's aide programs have combined also accounted for a large share of both applications and enrollments.
- Over the past ten years, growth in total applications has significantly outpaced growth in enrollments for these programs, with 2021/22 applications 49% (1,500 applicants) and enrollments 28% (1,300 students) above 2012/13 levels. There was a marked decline in applications in 2020/21 during the onset of COVID-19 but enrollments exhibited modest growth.
- Across Alberta, the main occupation linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling over 3,400 jobs between 2021 and 2030.

Alberta PSI System applications and new enrollments for programs related to education occupations, 2012-2022



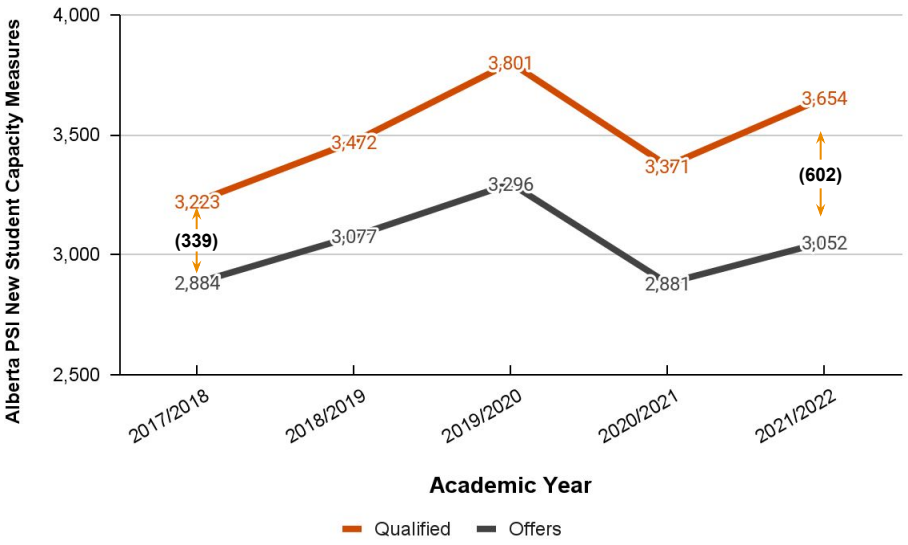
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
4413 Elementary and secondary school teacher assistants	• 13.01 Education, general • 13.15 Teaching assistants/aides • 19.07 Human development, family studies and related services

Education: more qualified students are applying, but growth in the number of offers sent has lagged behind

- The chart opposite details application data on the highlighted programs which commonly lead to education occupations. It shows the number of qualified applicants and offers sent between 2017/18 and 2021/22.
- The gap between qualified students and offers has been increasing steadily during this period from less than 350 to over 600.
- Over the past five years, there have been declines in the number of qualified applicants and offers sent for teaching assistant program, with decreases of 23% and 23%, respectively.
- By comparison, human development and family studies programs have experienced large upticks in the number qualified applicants and offers sent, with increases of 29% and 18%, respectively.

Alberta PSI System qualified applicants and offers sent for programs related to education occupations, 2017-2022

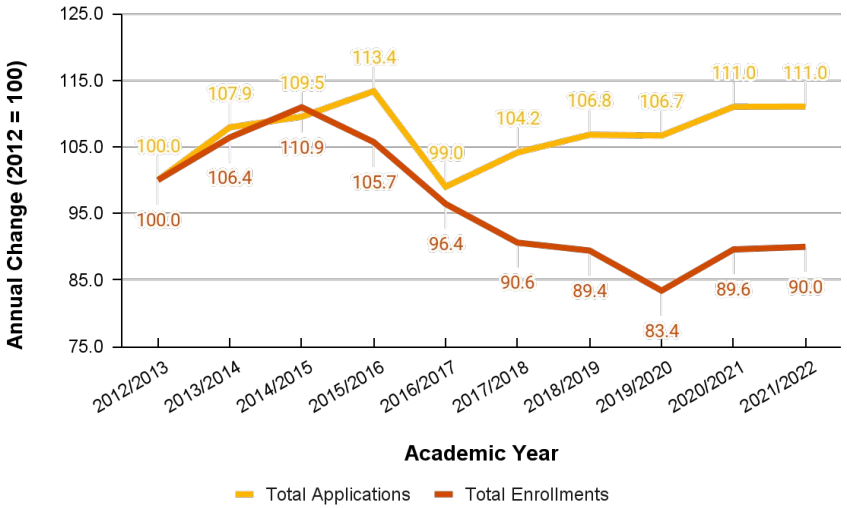


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Engineering: applications have risen over time, but a simultaneous decline in enrollments could amplify labour shortages

- The figure to the right details trends in Alberta PSI System applications and enrollments between the 2012/13 and 2021/22 Academic Years for programs that generally lead to engineering occupations. These are the aggregate figures for the programs listed in the table.
- System-wide applications and enrollments have largely comprised of general engineering programs. Chemical and mechanical engineering programs combined have also accounted for a large share of both applications and enrollments.
- Since 2016/17, total applications and enrollments for these programs have exhibited opposite trends. Following a sharp decline from its peak in 2016/17, applications have exhibited stable growth and were 11% above 2012/13 levels by 2021/22 (1,300 applicants). By comparison, there has been a steady decline in total enrollments, with 2021/22 enrollment 10% below 2012/13 levels (1,000 students).
- Across Alberta, the main occupation linked to these programs (shown in the table below) face a significant cumulative labour shortage, totalling over 3,300 jobs between 2021 and 2030.

Alberta PSI System applications and new enrollments for programs related to engineering occupations, 2012-2022



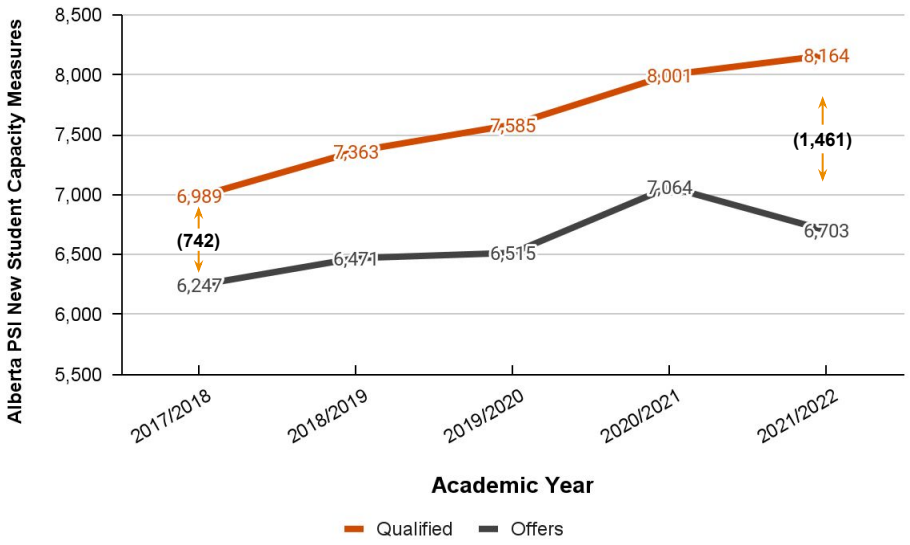
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Occupations	Most relevant post-secondary programs
2145 Petroleum engineers	• 14.01 General engineering • 14.07 - Chemical engineering • 14.19 - Mechanical engineering • 48.05 Precision metal working

Engineering: increases in the number of qualified students has largely outpaced offers sent

- The chart opposite details application data on the highlighted programs which commonly lead to engineering occupations. It shows the number of qualified applicants and offers between 2017/18 and 2021/22.
- This data is only available for the past five years and the large enrollment declines shown on the previous page occurred prior to this period.
- These figures show a widening gap between qualified applications and offers. This gap was 742 in 2017/18 and almost doubled to around 1,461 in 2021/22.
- Qualified applications are up 17% over the period shown while offers sent are up only 7% which can indicate capacity constraints.
- Over the past five years, there have been increases during this period in the number of qualified applicants and offers sent for specialized engineering programs including:
  - Chemical engineering programs, with qualified applicants and offers sent increasing by 4% and 7%, respectively.
  - Mechanical engineering programs, with qualified applicants and offers sent increasing by 13% and 16%, respectively.
- General engineering programs have also experienced increases during this period, with the number of qualified students and offers sent increasing by 20% and 7%, respectively.

Alberta PSI System qualified applicants and offers sent for programs related to engineering occupations, 2017-2022



Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Alberta PSIs are operating close to capacity for key programs, which limits their ability to increase enrollments and support provincial labour needs

To inform our analysis on system-wide capacity, we also held discussions with APSN member institutions in order to identify the reasons for the widening gap between applications and enrollments observed in the data over the past ten years.

The key theme from these discussions was that PSIs have broadly been at capacity and which has placed constraints on their ability to increase annual enrollments, in particular for select programs providing training for occupations the province is projected to face significant labour shortages in.

Some PSIs were also able to provide historical data on capacity for programs (measured as the number of students enrolled versus enrollment targets - with enrollment being at target levels indicating that a program was at full capacity). Most PSIs did not collect this data but indicated that they do operate at capacity given their funding level. Several trends could be observed in the data we did receive, which came from seven PSIs of the 26 APSN members.

- **Office workers:** *PSIs have consistently been operating at or above capacity for the major programs leading to these occupations, with enrollments for these programs on average remaining close to or above annual targets.*
- **Construction and trades:** *There has historically been some spare capacity for these programs with declining applications and enrollments in these areas, but following the pandemic, there has been a notable decrease in spare capacity driven due to rising enrollments.*
- **Health:** *PSIs have consistently been operating at high capacity levels for these programs. While elevated, this data suggests there may be small levels of spare capacity which could be driven by increases to annual enrollment targets as illustrated by the system-wide increase in enrollments during this period.*
- **Computer programming:** *Capacity has significantly been reduced, especially following the pandemic as enrollments have rapidly increased. Compared to 2017/18, PSIs are now close to target capacity for many of these programs.*
- **Education:** *Enrollments have steadily remained close to or above capacity targets for these programs over the past five years.*

**We note that information on capacity for engineering programs was not available from the PSIs that were able to provide data.*

A

Appendix A:

Assumptions and limitations

Assumptions and Limitations

Reliance on third party data/information: We relied upon the completeness, accuracy and fair presentation of all the information, data, advice, opinion or representations obtained from third parties and public sources. We have not conducted any audit or review of the information of, nor have we sought external verification of this information. We accept no responsibility or liability for any losses occasioned by any party as a result of our reliance on the financial and non-financial information that was provided to us or found in the public domain.

Receipt of new information: PwC reserves the right at its discretion to withdraw or revise this report should we receive additional information or be made aware of facts existing at the date of the report that were not known to us when we prepared this report. The findings are as of May 2023 and PwC is under no obligation to advise any person of any change or matter brought to its attention after such date, which would affect our findings.

Use limitations: This report has been prepared solely for the use and benefit of, and pursuant to a client relationship exclusively with the APSN. This report is not intended or authorized for any other use or party. If any unauthorized party obtains this report, such party agrees that any use of the report, in whole or in part, is their sole responsibility and at their sole and exclusive risk; that they may not rely on the report and that they do not acquire any rights as a result of such access. PwC accepts no duty of care, obligation, or liability, if any, suffered by APSN or any third party as a result of an interpretation made by those parties of this report.

Further, no other person or entity shall place any reliance upon the accuracy or completeness of the statements made herein. In no event shall PwC have any liability for damages, costs or losses suffered by reason of any reliance upon the contents of this report by any person other than APSN.

This report and related analysis must be considered as a whole: Selecting only portions of the analysis or the factors considered by us, without considering all factors and analysis together, could create a misleading view of our findings. The preparation of our analysis is a complex process and is not necessarily susceptible to partial analysis or summary description. Any attempt to do so could lead to undue emphasis on any particular factor or analysis.

We note that significant deviations from the above listed major assumptions may result in a significant change to our analysis.

B

Appendix B:

List of APSN member institutions

Appendix B: List of APSN Member Institutions

Institution Type	Member Institutions	
Comprehensive Academic and Research Universities	• Athabasca University • University of Alberta	• University of Calgary • University of Lethbridge
Undergraduate Universities	• Alberta University of the Arts • MacEwan University	• Mount Royal University
Polytechnic Institutions	• Northern Alberta Institute of Technology • Southern Alberta Institute of Technology	• Northwestern Polytechnic • Red Deer Polytechnic
Comprehensive Community Colleges	• Bow Valley College • Keyano College • Lakeland College • Lethbridge College • Medicine Hat College	• Norquest College • Northern Lakes College • Olds College • Portage College
Specialized Arts and Cultural Institutions	• Banff Centre for Arts and Creativity	
Independent Academic Institutions	• Ambrose University • Burman University • Concordia University of Edmonton	• The King's University • St. Mary's University

C

Appendix C:

Alberta labour shortage data tables

Appendix C: Alberta Labour Shortage Data Tables

Top 20 occupations in Alberta by largest cumulative forecasted labour shortage, 2021 - 2030

Occupation	Cumulative Shortage, 2030	Ratio of Cumulative Shortage to 2021 Job Openings	Occupation	Cumulative Shortage, 2030	Ratio of Cumulative Shortage to 2021 Job Openings
1414 Receptionists	***11,389***	***7.6***	*3012 Registered nurses and registered psychiatric nurses*	***4,428***	***1.5***
1411 General office support workers	***9,696***	***5.4***	*0712 Home building and renovation managers*	***4,242***	***5.9***
1431 Accounting and related clerks	***7,951***	***7.0***	*2171 Information systems analysts and consultants*	***3,773***	***2.4***
7611 Construction trades helpers and labourers	***7,793***	***5.9***	*7205 Contractors and supervisors, other construction trades, installers, repairers and servicers*	***3,764***	***6.5***
6411 Sales and account representatives - wholesale trade (non-technical)	***6,414***	***4.3***	*2174 Computer programmers and interactive media developers*	***3,743***	***4.9***
6622 Store shelf stockers, clerks and order fillers	***6,066***	***3.4***	*5241 Graphic designers and illustrators*	***3,551***	***11.1***
1432 Payroll clerks	***5,745***	***9.4***	*4413 Elementary and secondary school teacher assistants*	***3,419***	***1.5***
1521 Shippers and receivers	***5,312***	***5.7***	*3413 Nurse aides, orderlies and patient service associates*	***3,400***	***1.4***
5254 Program leaders and instructors in recreation, sport and fitness	***5,084***	***6.0***	*2145 Petroleum engineers*	***3,318***	***5.8***
8612 Landscaping and grounds maintenance labourers	***4,799***	***6.7***	*3233 Licensed practical nurses*	***3,187***	***3.4***

Source: PwC Analysis based on data from Government of Alberta, "Alberta's Occupational Outlook 2021 - 2030"

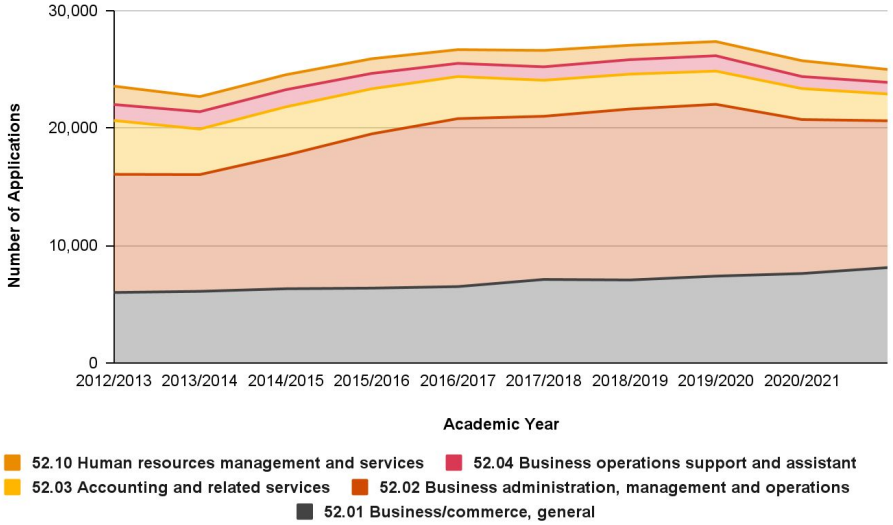
D

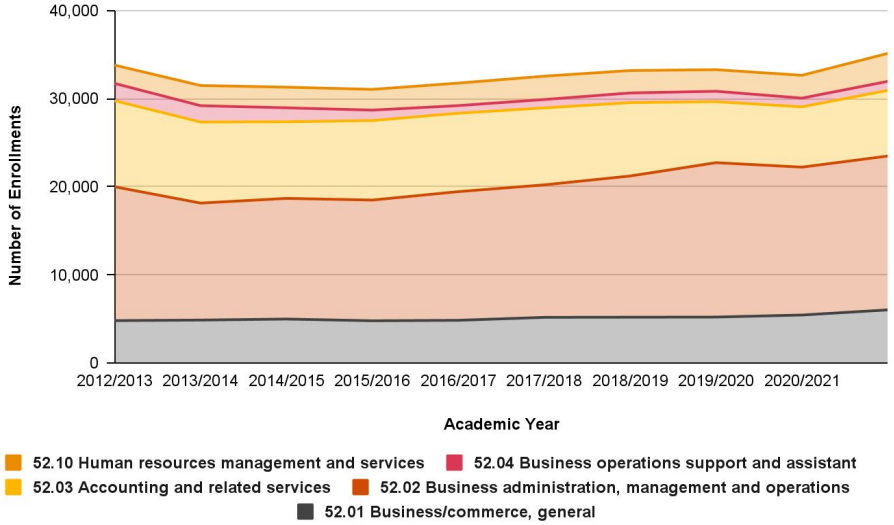
Appendix D:

Detailed Applications and Enrollments for Occupational Groupings

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to office worker occupations, 2012-2022

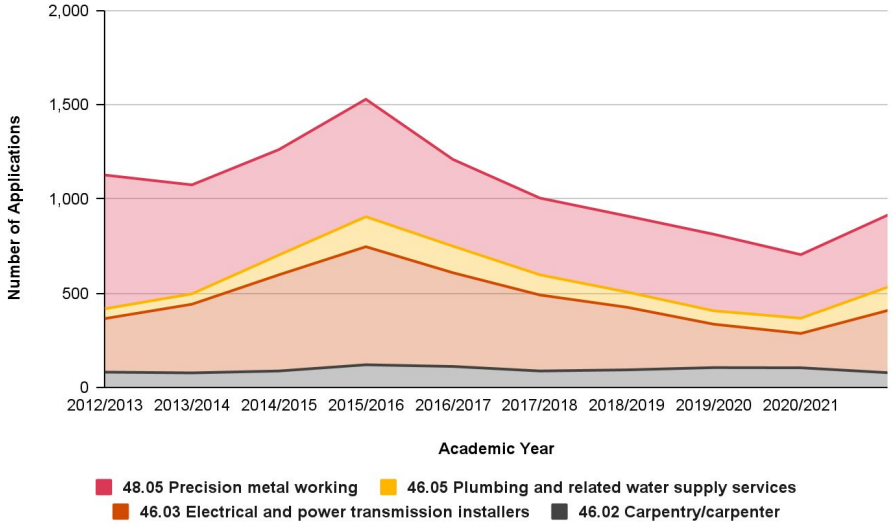


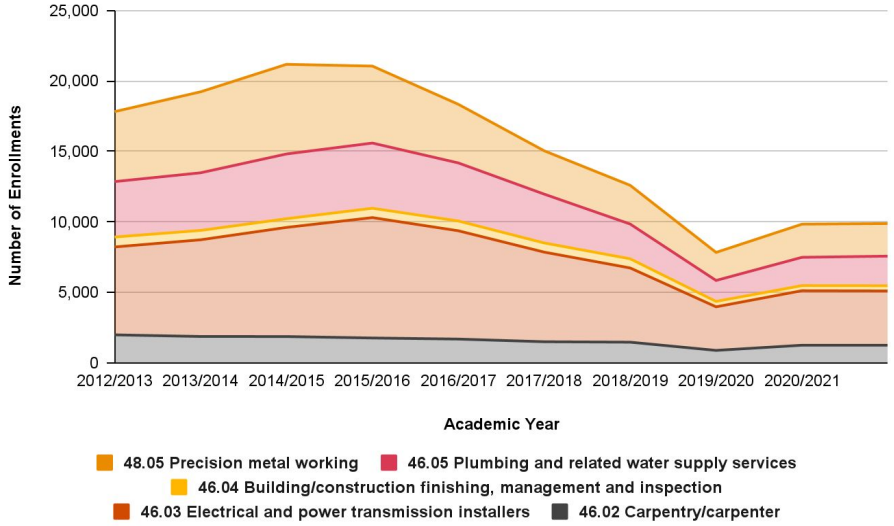


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to construction and trades occupations, 2012-2022*



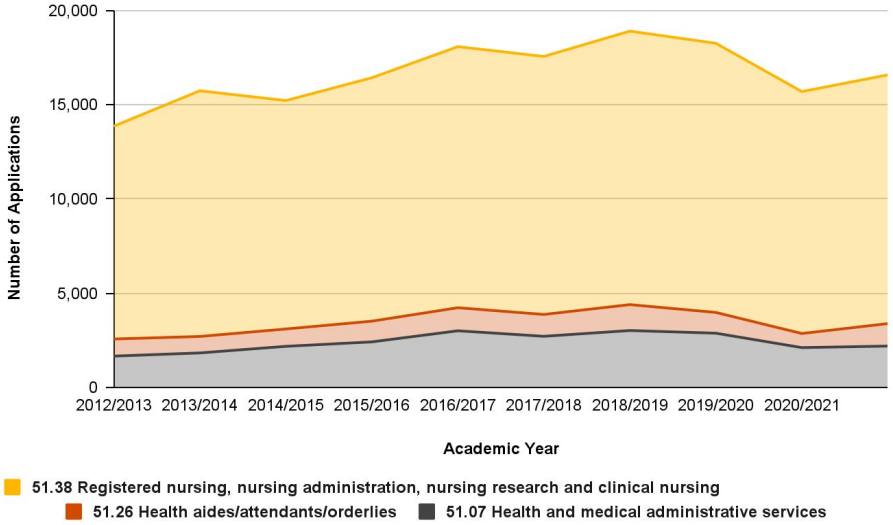


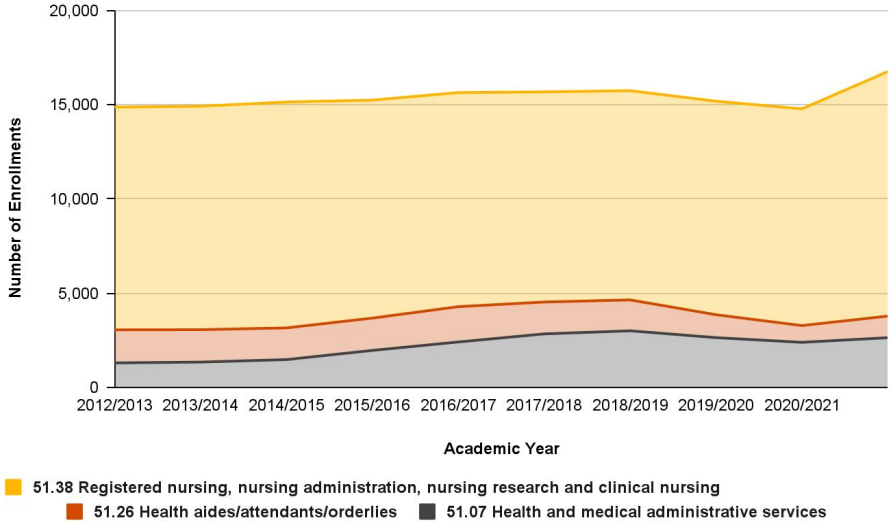
Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

We note that due to data limitations, information on annual system-wide applicants for **46.04 Building/construction finishing, management and inspection was unavailable from ASI.*

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to health occupations, 2012-2022

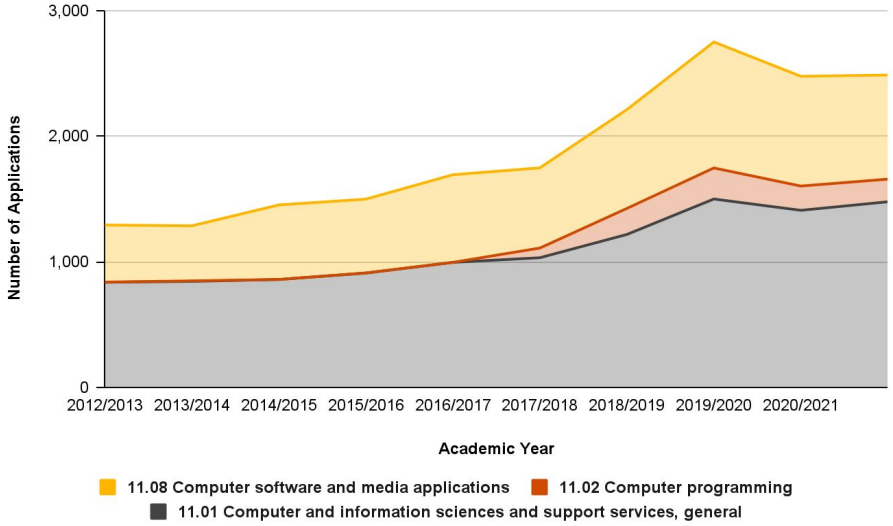


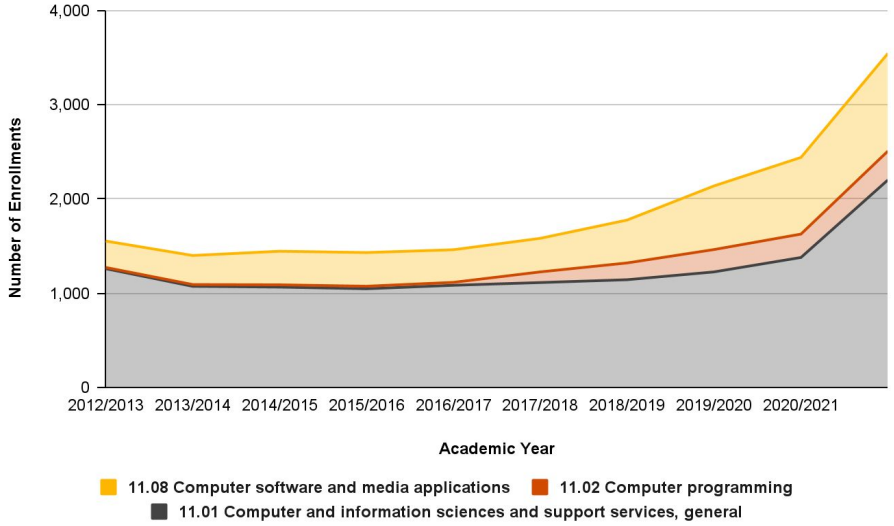


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to computer programming occupations, 2012-2022

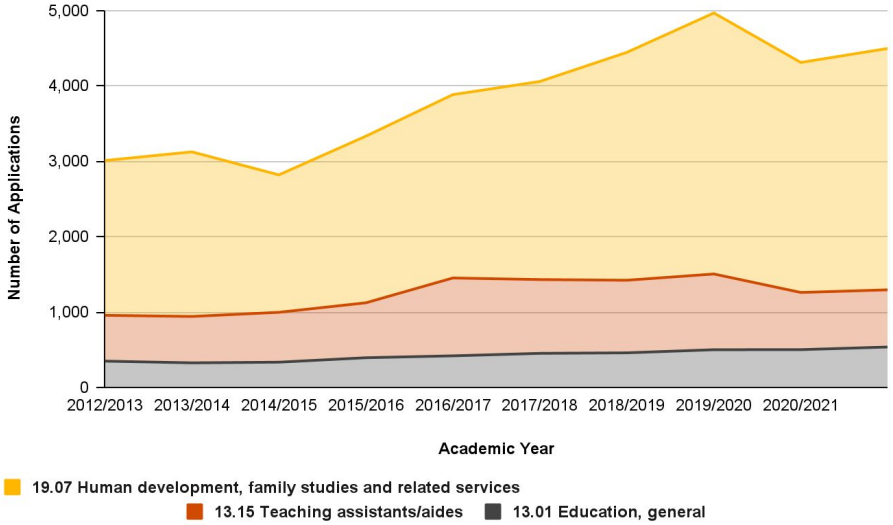


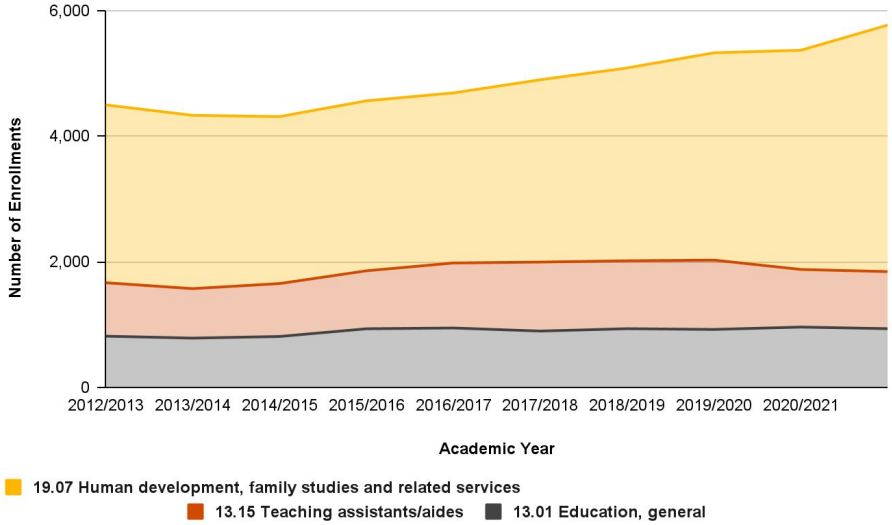


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to education occupations, 2012-2022

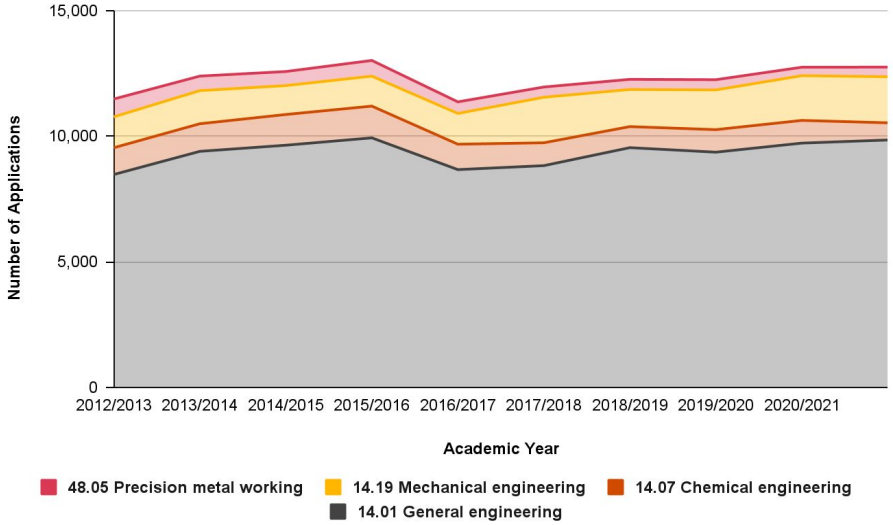


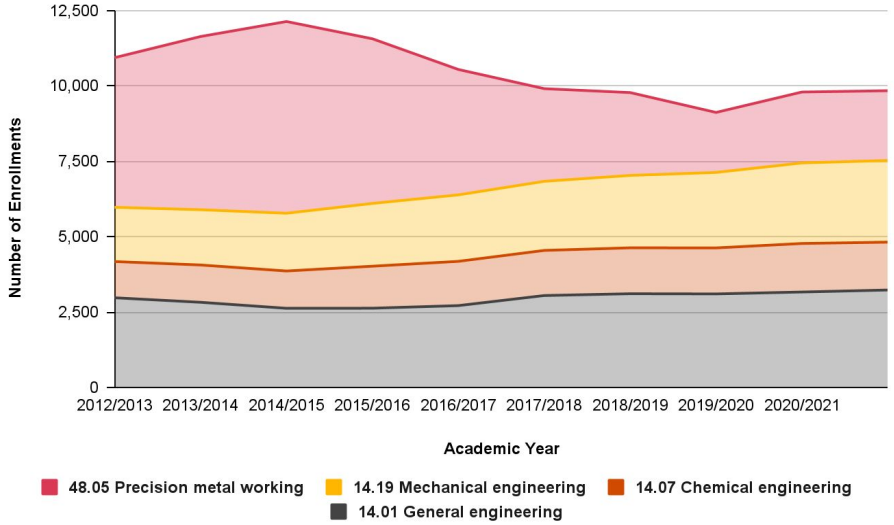


Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

Appendix D: Detailed Applications and Enrollments for Occupational Groupings

Alberta PSI System applications and enrollments for programs related to engineering occupations, 2012-2022





Source: PwC Analysis based on data from Government of Alberta, "Learner and Enrolment Reporting System" & "Application Submission Initiative". Figures do not include data from the Banff Centre for Arts and Creativity.

pwc.com

The report has been prepared for the APSN in accordance with the terms of our engagement letter dated July 12, 2022 and for no other purpose. We do not accept or assume any liability or duty of case for any other purpose or to any other person to whom this report is shown or into whose hands it may come save where expressly agreed by our prior consent in writing.

© 2023 PricewaterhouseCoopers LLP, an Ontario limited liability partnership. All rights reserved. PwC refers to the Canadian firm, and may sometimes refer to the PwC network. Each member firm is a separate legal entity. Please see www.pwc.com/structure for further details.