Analysis of the distribution of gender in STEM fields in Canada

NSERC Chairs for Women in Science and Engineering
CRSNG Chaires pour les femmes en sciences et génie

Réseau National Network

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Access to the Statistics Canada survey data used in this study was granted to Ms Perreault and permission to release these files was obtained by Ms Perreault. The data for this report come from the 2011 National Household Survey (NHS), the Labour Force Survey (LFS) 2001-2016, and the National Graduates Survey (NGS) 200-2009. The response rate for the NHS was 68%. The LFS is conducted monthly and provides information on major labour market trends by industry, occupation, hours worked, employment rate and unemployment rate. Data for the Northwest Territories, Yukon and Nunavut are excluded from the LFS statistics. The NGS is conducted periodically and explores the relationship between the graduates' programs of study and the employment subsequently obtained, among other things. For all three data sets, the weighted counts have been used as estimates for the populations of interest.

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Although the research and analysis are based on data from Statistics Canada, opinions expressed do not represent the view of Statistics Canada or the Canadian Research Data Centre Network (CRDCN).

Final Report compiled on January 29th, 2018

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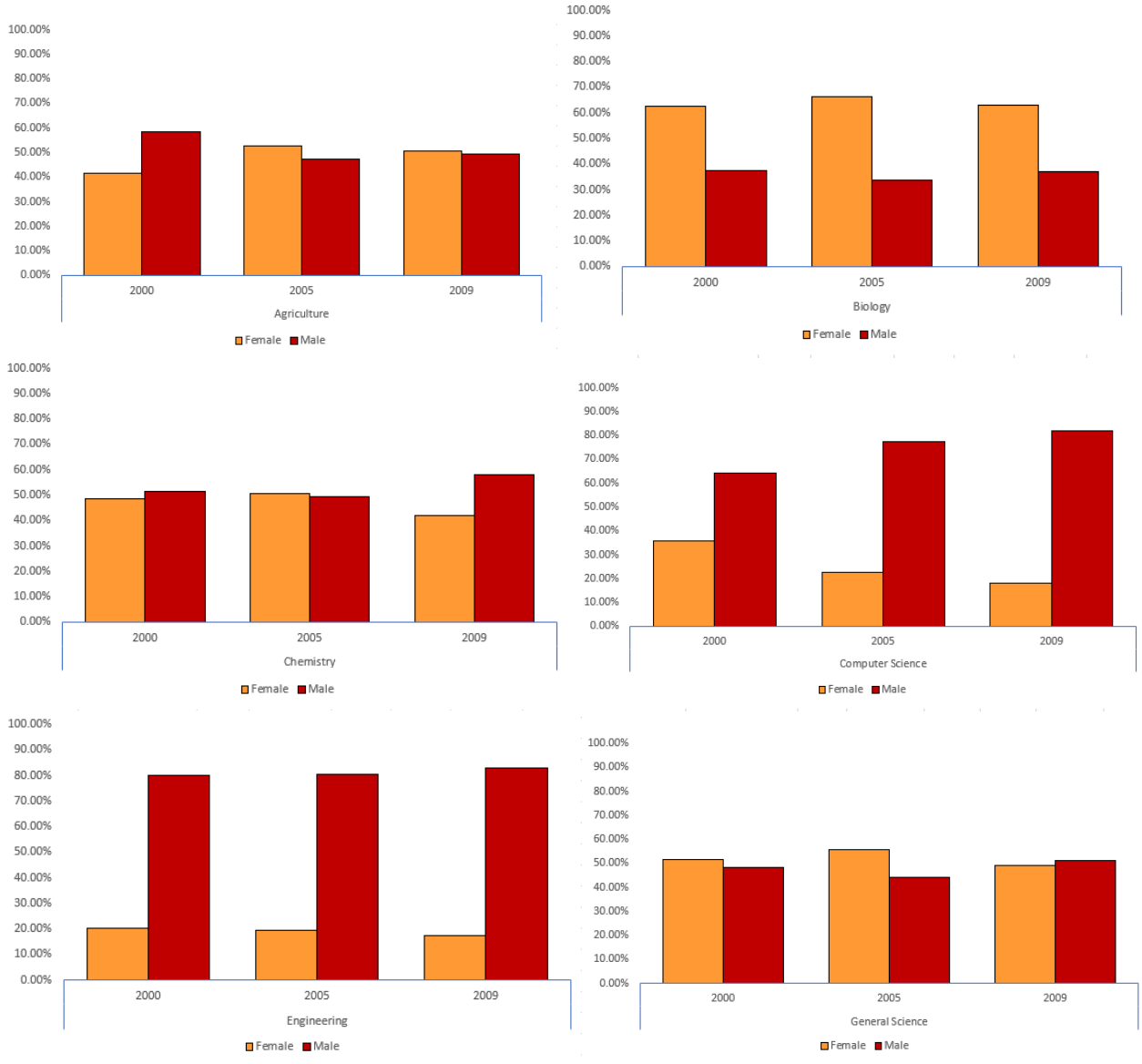
1. UNDERGRADUATE AND GRADUATE DEGREES AWARDED IN STEM FIELDS

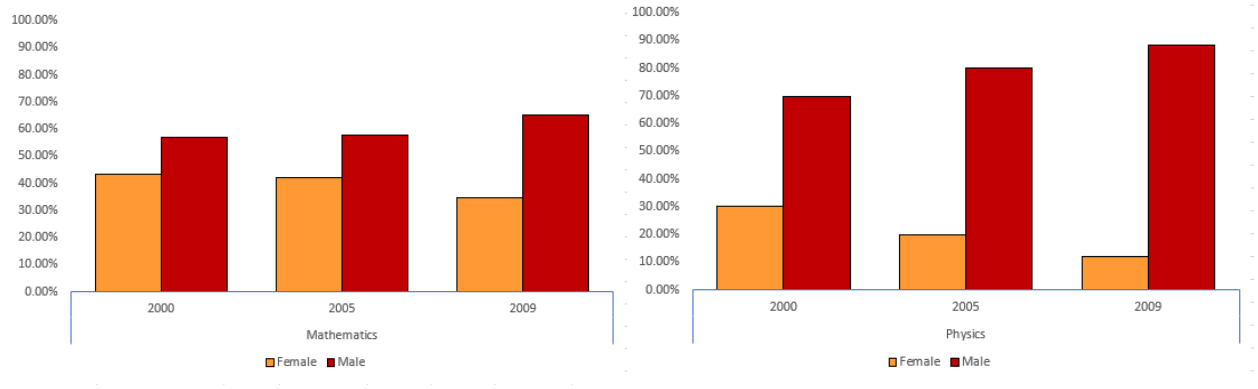
The population of interest is graduates from Canadian public post-secondary education institutions (universities, colleges and trade schools) who graduated or completed the requirements for degrees, diplomas or certificates during the year in question[1], and who reported their degree of study as one of the following STEM fields: agriculture, biology, chemistry, computer science, engineering, general science, mathematics and physics.

1.1 DEGREES AWARDED BY SEX

The distribution of degrees awarded by sex, across gender and year is explored (Chart 1.1). For agriculture, general science and chemistry, the distribution of sex is approximately the same for males as for females. In agriculture, females represented slightly fewer of the degrees awarded, at 41.6%. This increased in 2009 to approximately 50.6%. The reverse was seen in chemistry, with females representing 48.7% of degrees awarded in 2000, but only 42.1% in 2009.

Chart 1.1 - Proportion of degrees awarded in STEM fields by sex in Canada, from 2000-2009





Source: NGS 2000-2009

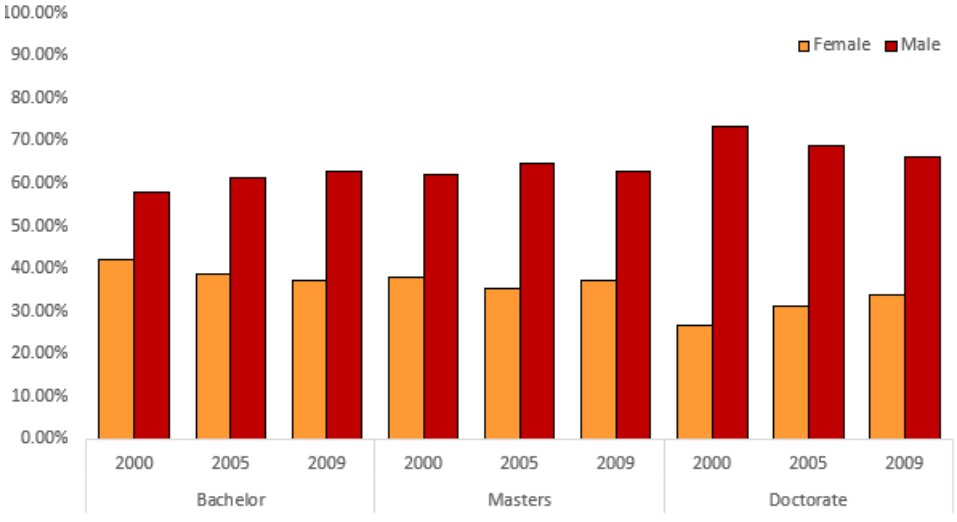
In biology, the distribution of degrees awarded to females remained approximately the same throughout the years, at 62.6% in 2000, and 63.1% in 2009. There was a decrease in the degrees awarded to females in mathematics, from 43.1% in 2000, to 34.9% in 2009. The same trend was seen in engineering, with females representing 20.2% of the degrees awarded in 2000, and slightly fewer in 2009 at 17.2%. There was a noticeable drop in the distribution of degrees awarded by gender in physics and computer science from 2000 to 2009. In 2000, females represented 30.1% of degrees awarded in physics, and only 11.8% in 2009. For computer science, women represented 35.7% of degrees awarded in 2000, and only 18.1% in 2009.

1.2 DEGREES AWARDED BY SEX AND TYPE OF DEGREE AWARDED

The distribution of degree awarded across the three types of degrees is explored: Bachelor, Masters and Doctorate, for those who reported their degree of study as one of the following STEM fields: agriculture, biology, chemistry/physics, computer science, engineering, general science and mathematics. It is important to note that this does not include post-secondary trade certificates.

The distribution of females across STEM fields by type of degree was lower than males, for all three degree types (Chart 1.2). For Bachelor's degrees, the distribution of females who were awarded degrees in STEM fields was highest, at 42.2% in 2000, and lowest in 2009, at 37.3%. The distribution of Masters degrees awarded to females remained relatively constant, and was at 37.2% in 2009. For Doctorate degrees awarded, the distribution of females was lowest in 2000, at 26.8%, and rose to 33.9% in 2009.

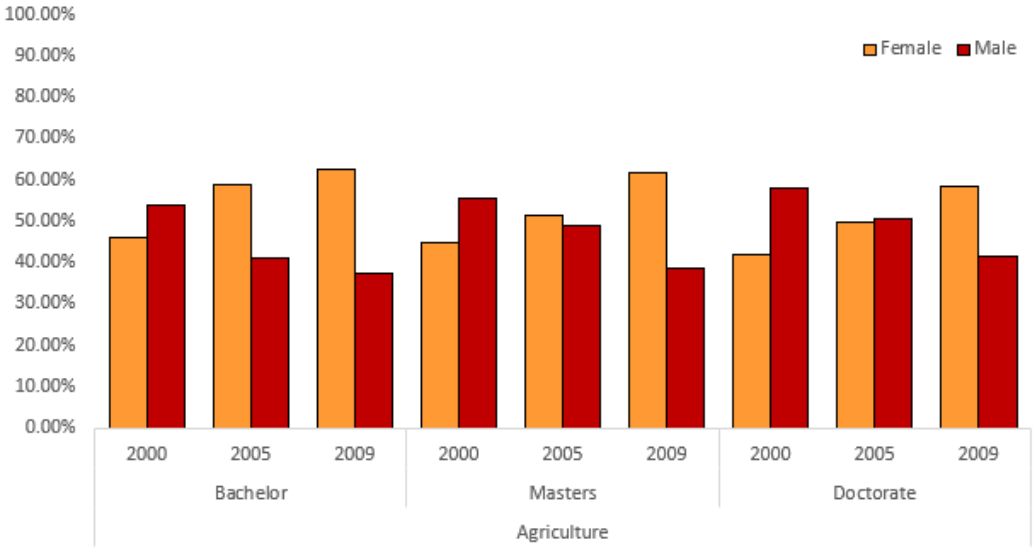
Chart 1.2 - Proportion of degrees awarded in STEM fields by sex in Canada, from 2000-2009



Source: NGS 2000-2009

For all types of degrees awarded in agriculture, the distribution of females had increased from 2000 to 2009 (Chart 1.3). For Bachelors degrees, the distribution of females was 46.2% in 2000, and increased to 62.7% in 2009. For Masters degrees, the distribution of females who were awarded degrees was 44.6%, and rose to 61.5% in 2009. For Doctorate degrees awarded, the distribution of females was 42.0% in 2000, and 58.3% in 2009.

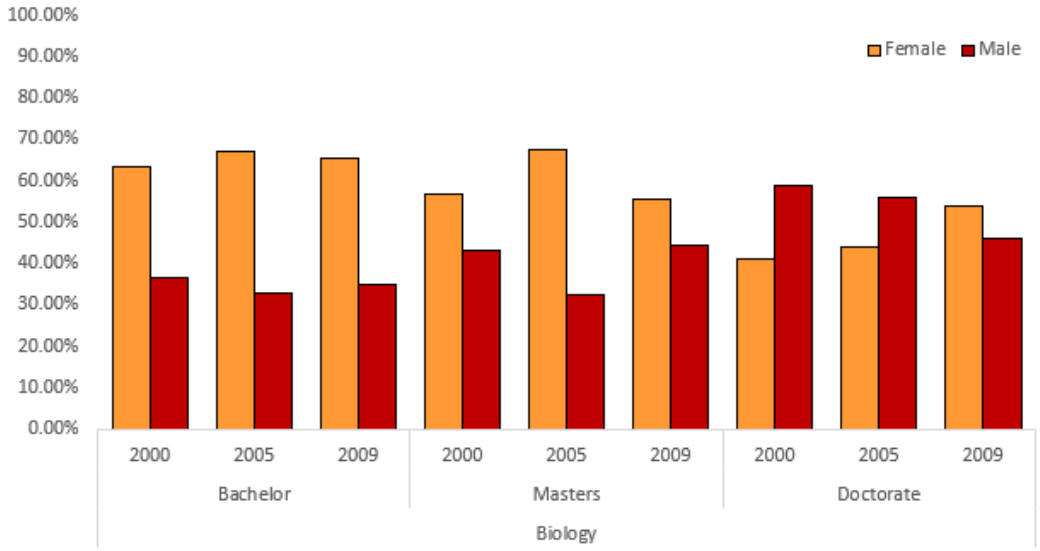
Chart 1.3 - Percentage of degrees awarded in agriculture by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

Overall, in biology, the higher the education level, the lower the distribution of degrees awarded to females (Chart 1.4). For Bachelors degrees, the distribution remained relatively stable from 2000 to 2009, at approximately 65%. For Masters degrees, the distribution of degrees awarded to females was 67.6% in 2005, and fell to 55.6% in 2009. For Doctorate degrees awarded in biology, the distribution of females was 41.2% in 2000, and rose to 54.0% in 2009.

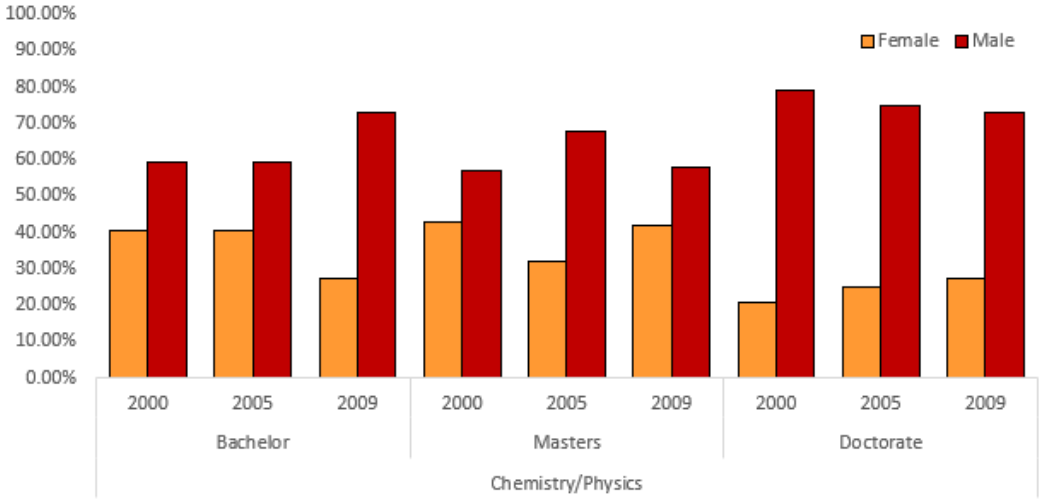
Chart 1.4 - Percentage of degrees awarded in biology by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

For degrees awarded in chemistry/physics, the distribution of females was lowest for Doctorate degrees (Chart 1.5). For Bachelor's degrees in 2000, 40.6% of degrees awarded were to females, and dropped in 2009 to 27.1%. For Masters degrees, the distribution of degrees awarded to females was 43.0% in 2000, and 42.0% in 2009. For Doctorate degrees, females represented 20.8% of degrees awarded in 2000. This rose slightly to 27.2% in 2009.

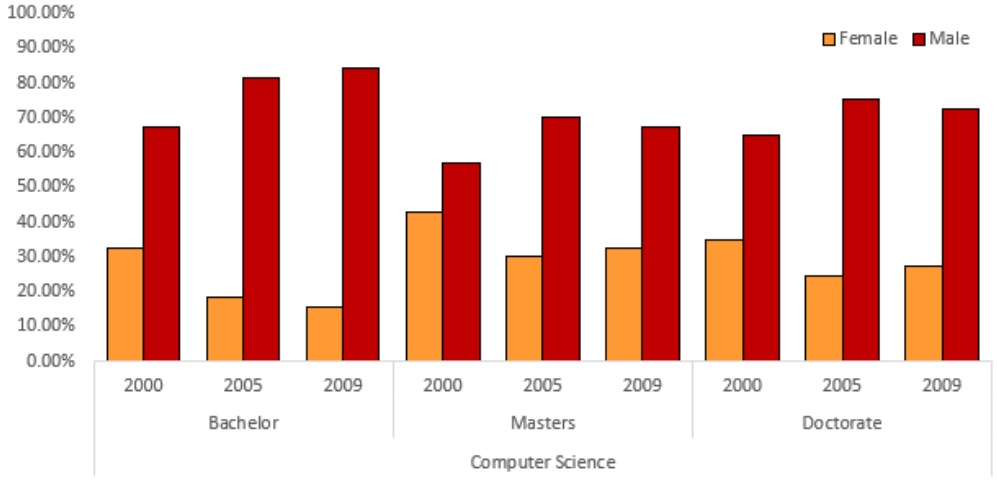
Chart 1.5 - Percentage of degrees awarded in chemistry/physics by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

For all types of degrees awarded in computer science, the distribution of degrees awarded to females had decreased from 2000 to 2009 (Chart 1.6). For Bachelor's degrees in 2000, the distribution of degrees awarded to females was 32.8%. This decreased by more than half in 2009, to 15.8%. For Masters degrees awarded, the distribution awarded to females in 2000 was 43.0%, and lowered to 32.8% in 2009. For Doctorate degrees awarded, the distribution of degrees awarded to females was 32.1% in 2000, and 27.3% in 2009.

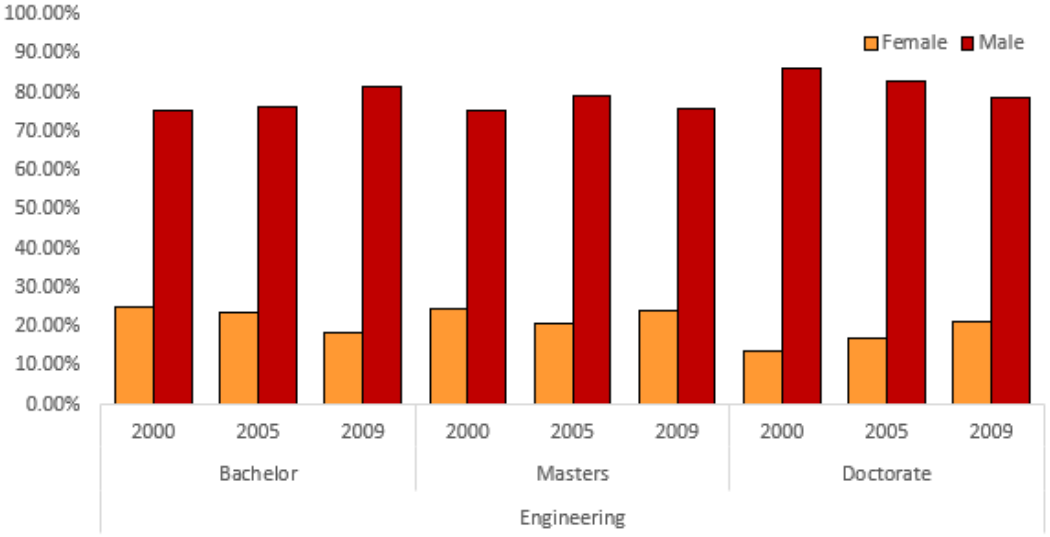
Chart 1.6 - Percentage of degrees awarded in computer science by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to females in engineering was relatively low for all degree types (Chart 1.7). For Bachelor's degrees, the distribution awarded to females was 27.8%, and lowered to 18.6% in 2009. For Masters degrees awarded to females, the distribution was 24.6% in 2000, and 24.3% in 2009. The distribution of Doctorate degrees awarded to females had increased from 13.8% in 2000 to 21.2% in 2009.

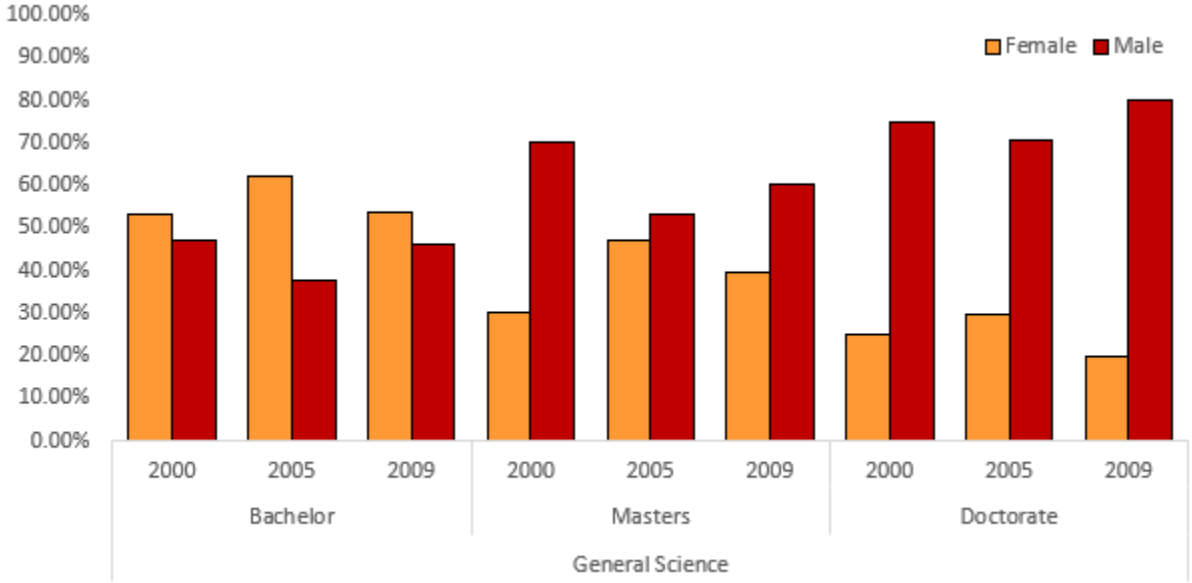
Chart 1.7 - Percentage of degrees awarded in engineering by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

For Bachelor's degrees awarded in general science, the distribution of females was 53.0% in 2000, and 53.8% in 2009 (Chart 1.8). For Masters degrees awarded, 30% were awarded to females in 2000. This increased slightly by 2009, to 39.8%. The distribution of degrees awarded in general science at the Doctorate level to females was 25.2%, and lowered to 20.0% by 2009.

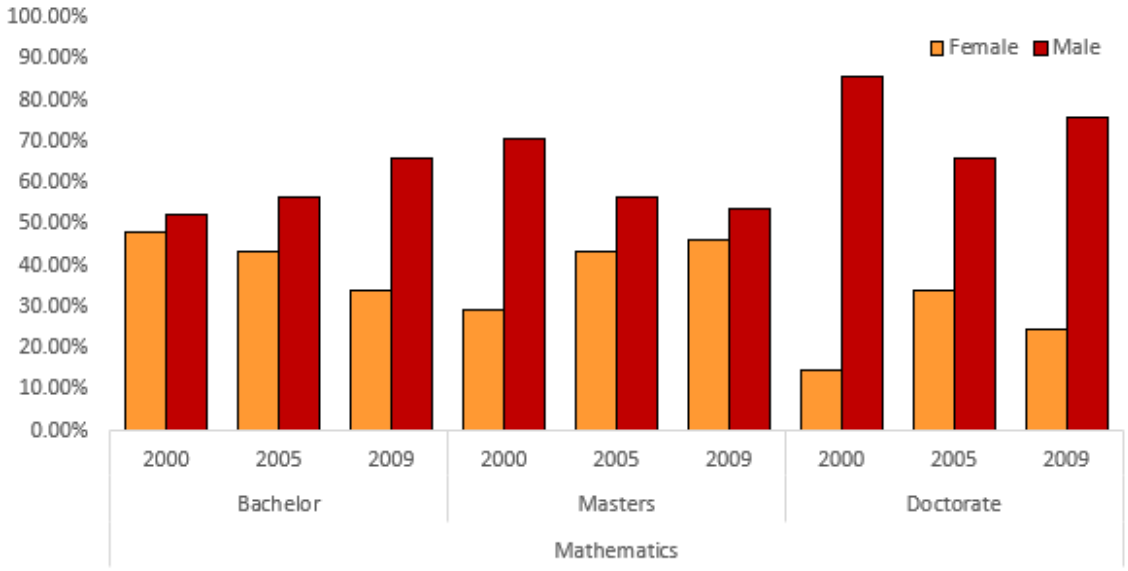
Chart 1.8 - Percentage of degrees awarded in general science by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

In mathematics, there had been a decrease in the distribution of degrees awarded to females from 34.12% in 2000, to 27.9% in 2009 (Chart 1.9). However, the opposite was seen at the Masters and Doctoral level. For degrees awarded at the Masters level, the distribution of females in 2000 was 29.4%. This increased to 46.2% in 2009. For degrees awarded at the Doctoral level, 14.4% were awarded to females in 2000, and this increased to 24.3% in 2009.

Chart 1.9 - Percentage of degrees awarded in mathematics by sex in Canada, from 2000-2009.



Source: NGS 2000-2009

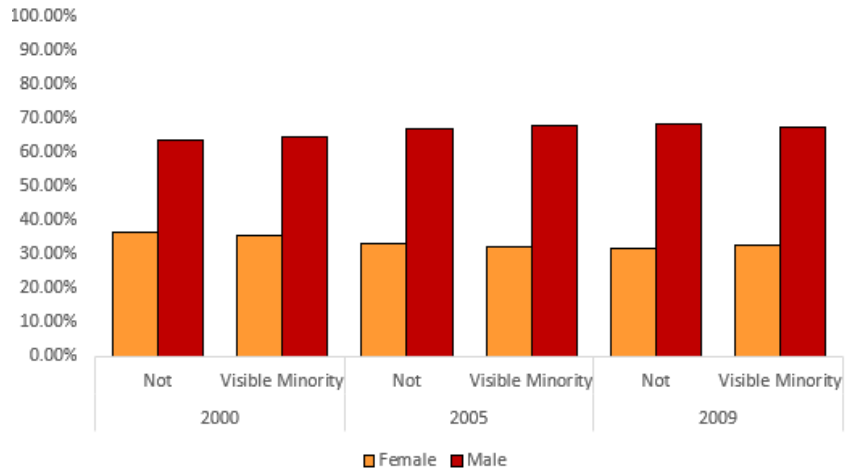
1.3 DEGREES AWARDED BY SEX AND VISIBLE MINORITY STATUS

The population of interest is graduates from Canadian public post-secondary education institutions (universities, colleges, trade schools) who graduated or completed the requirements for degrees, diplomas or certificates during the year in question, who reported their degree of study as one of the following STEM fields: agriculture, biology, chemistry, computer science, engineering, general science, mathematics and physics, and who identify as a visible minority or not.

The distribution of degrees awarded by sex, across visible minority status is explored. Visible minority refers to whether a person belongs to a visible minority group as defined by the Employment Equity Act, which defines visible minorities as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour". The visible minority population consists mainly of the following groups: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean and Japanese[2].

For all of Canada, the distribution of gender across visible minority status was relatively constant from 2000-2009, with women receiving approximately 35% of degrees awarded and men receiving approximately 65% (Chart 1.10).

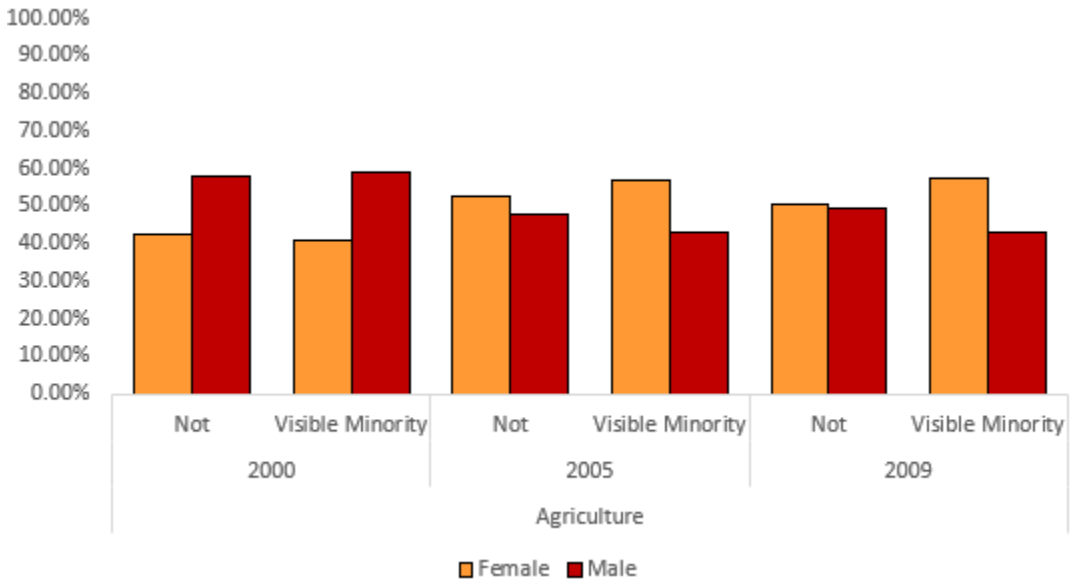
Chart 1.10 - Percentage of degrees awarded in STEM fields by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

In agriculture, the distribution of degrees awarded to females was similar for visible minorities and for those who did not identify as visible minorities, at approximately 40% (Chart 1.11). The distribution of degrees awarded to non-minority females was 50.4% in 2009, slightly below the distribution of degrees awarded to visible minority females at 57.3%.

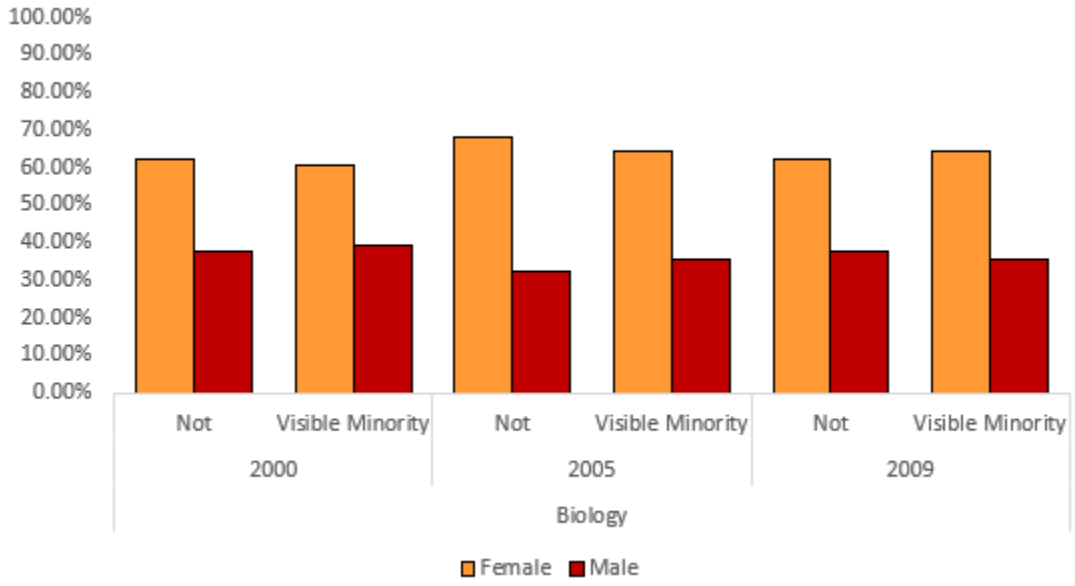
Chart 1.11- Percentage of degrees awarded in agriculture by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to females in biology was approximately the same for visible minorities as for non-visible minorities (Chart 1.12). In 2000, the distribution of females for visible minorities was 60.7%, and 62.44% for non-visible minorities. In 2009, the distribution of degrees awarded to visible minority females was 64.6%, and slightly lower for non-visible minority females at 62.3%.

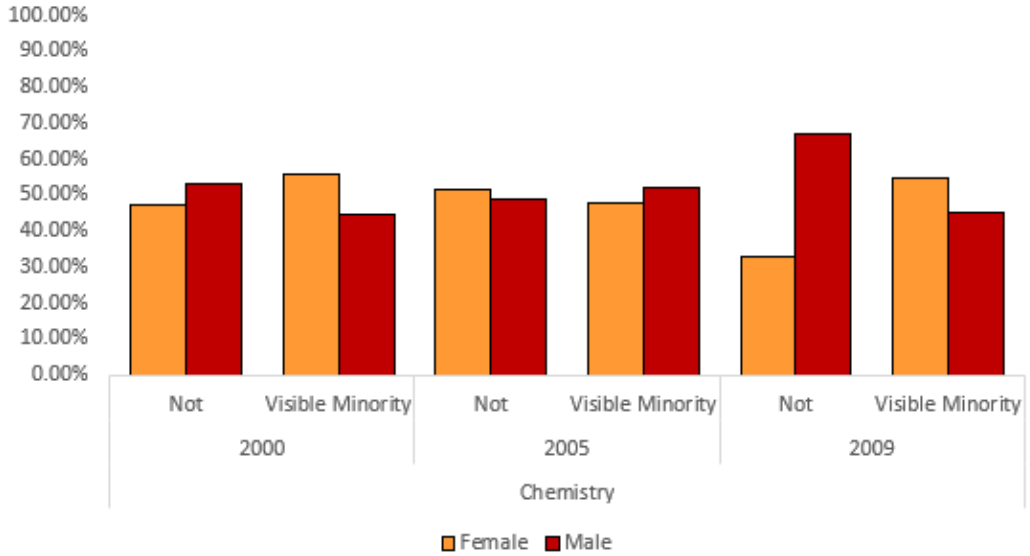
Chart 1.12- Percentage of degrees awarded in biology by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to non-visible minority females had decreased from 2000 to 2009 (Chart 1.13). In 2000, the distribution was almost equal, with 47.0% of degrees awarded to females. In 2009, this decreased to 34.9%. For visible minorities, the distribution of degrees awarded to females was 55.6% in 2000, and decreased slightly to 54.8% in 2009.

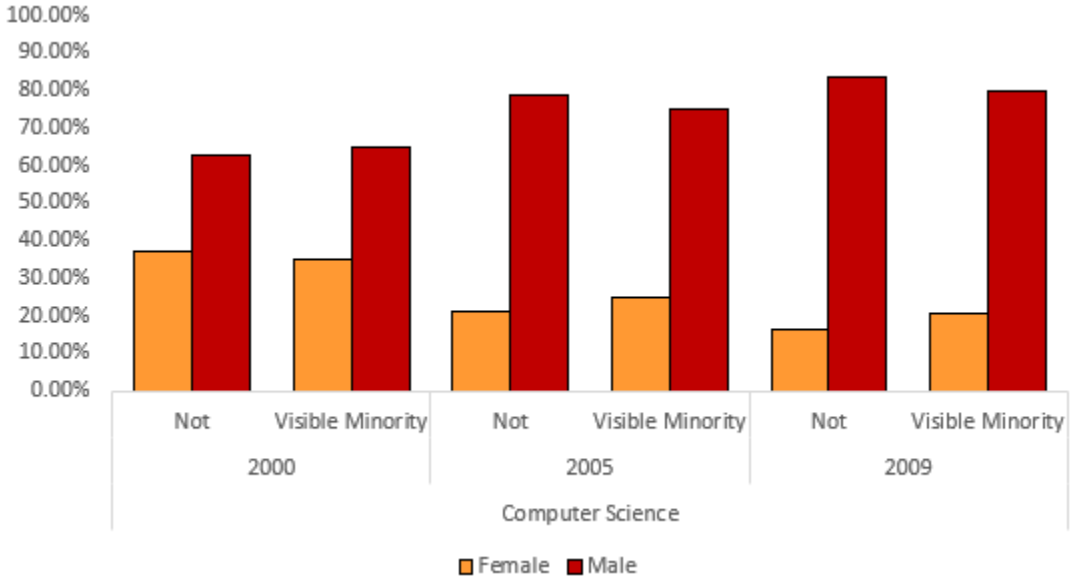
Chart 1.13- Percentage of degrees awarded in chemistry by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to females had decreased from 2000 to 2009, for both visible minorities and those who identified as non-visible minorities in computer science (Chart 1.14). For visible minorities, the distribution of degrees awarded to females was 35.2% in 2000, and decreased to 20.4% in 2009. For non-visible minorities, the distribution of degrees awarded to females was 37.1% in 2000, and 16.3% in 2009.

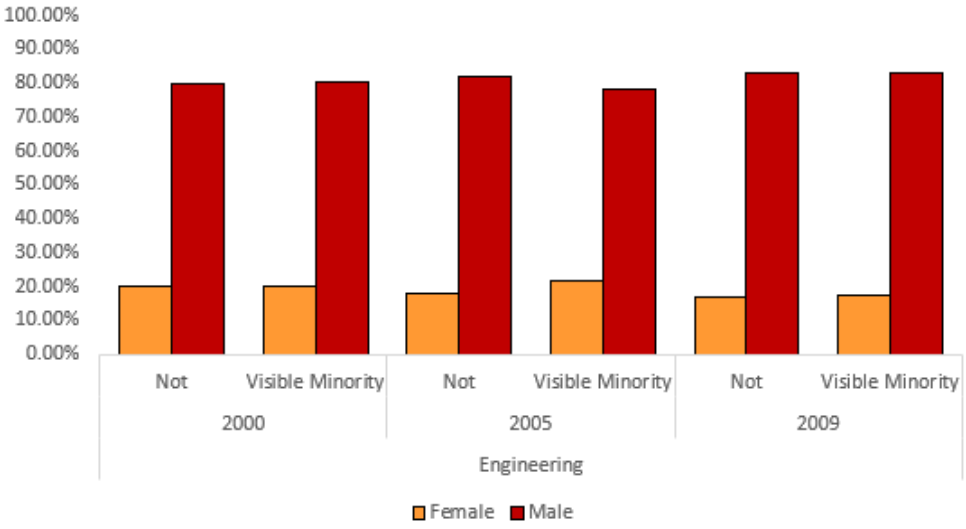
Chart 1.14 - Percentage of degrees awarded in computer science by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to females had decreased slightly in engineering for both visible and non-visible minorities (Chart 1.15). In 2000, the distribution of degrees awarded non-visible minority females was 20.2%, and decreased to 17.1% in 2009. For visible minorities, the distribution of degrees awarded to females was 19.8% in 2000, and 17.2% in 2009.

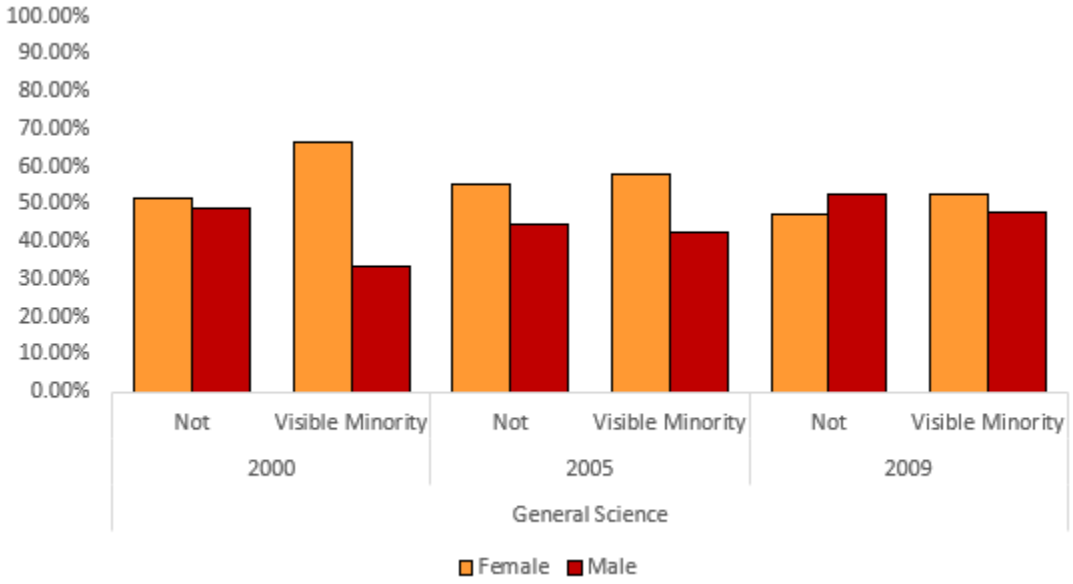
Chart 1.15- Percentage of degrees awarded in engineering by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

For general science, the distribution of degrees awarded to females for visible minorities was 51.4% in 2000, and lowered to 47.5% in 2009 (Chart 1.16). For non-visible minorities, the distribution of degrees awarded to females was 66.5% in 2000, and lowered to 52.4% in 2009.

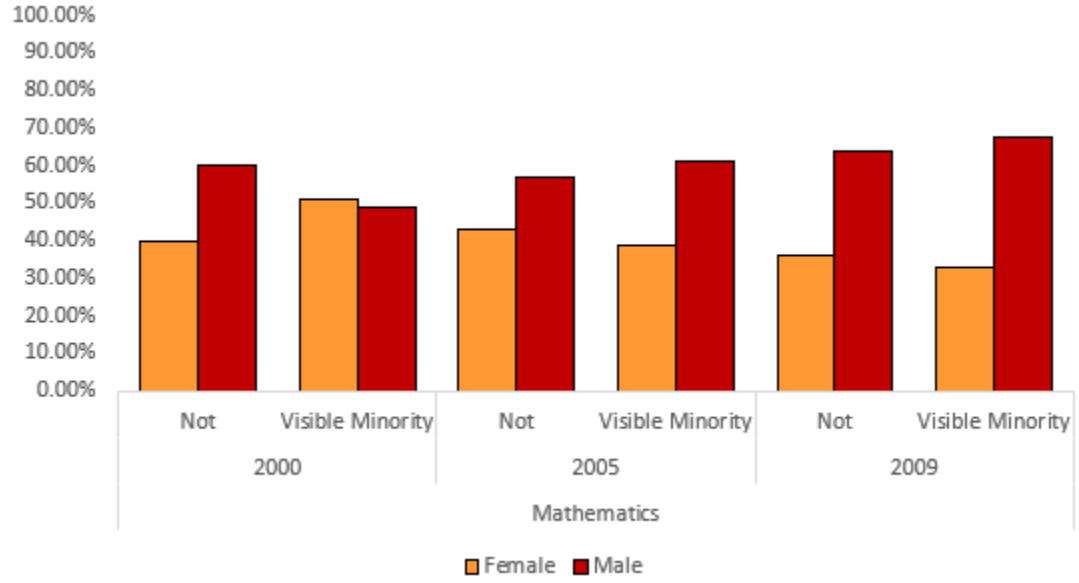
Chart 1.16 - Percentage of degrees awarded in STEM general science by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

For both visible and non-visible minorities, the distribution of degrees awarded to females had decreased in mathematics from 2000 to 2009 (Chart 1.17). For non-visible minorities, the distribution of degrees awarded to females was 40%, and decreased to 36.0% in 2009. For visible minorities, the distribution of degrees awarded to females was approximately the same as for males, at 51%. This distribution decreased to 32.6% in 2009.

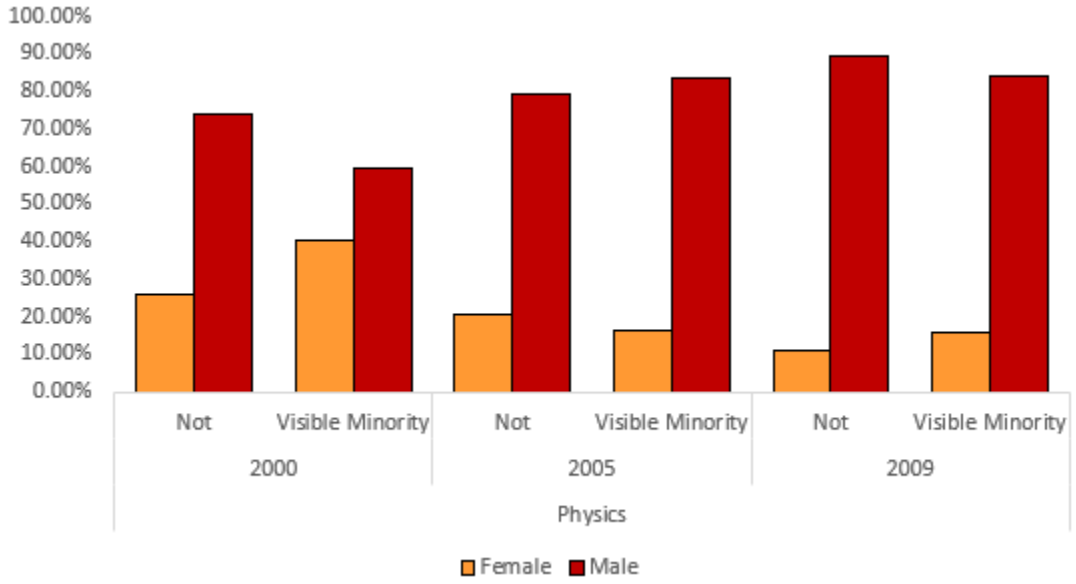
Chart 1.17 - Percentage of degrees awarded in mathematics by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of degrees awarded to females is physics had decreased quite substantially from 2000 to 2009 (Chart 1.18). For visible minorities, the distribution of females was 40.5% in 2000. This decreased to 16.0% in 2009. For non-visible minorities, the distribution of degrees awarded to females in 2000 was 20.0%, and decreased to 10.8% in 2009.

Chart 1.18 - Percentage of degrees awarded in physics by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

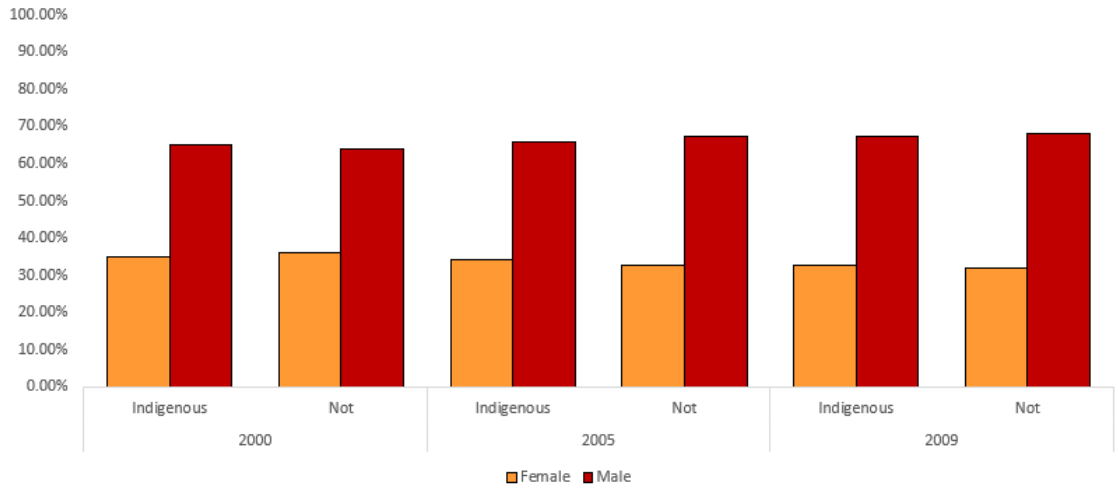
1.4 DEGREES AWARDED BY SEX AND INDIGENOUS STATUS

The population of interest is graduates from Canadian public post-secondary education institutions (universities, colleges, trade schools) who graduated or completed the requirements for degrees, diplomas or certificates during the year in question[2], and who reported their degree of study as one of the following STEM fields: agriculture, biology, chemistry, computer science, engineering, general science, mathematics and physics and who identified as Indigenous or not.

The distribution of degrees awarded by sex, across visible Indigenous status is explored. Indigenous status refers to whether the person reported being an Aboriginal person; that is, First Nations, Métis or Inuk and/or being a Registered or Treaty Indian (that is, registered under the Indian Act of Canada) and/or being a member of a First Nation or Indian band[3].

For all of Canada, the distribution of gender across Indigenous status remained relatively constant from 2000-2009 (Chart 1.19), with females receiving approximately 34% of degrees awarded. A similar trend was seen for non-Indigenous people, with females receiving approximately a third of all degrees awarded. Men received about 62% of degrees regardless of indigenous status.

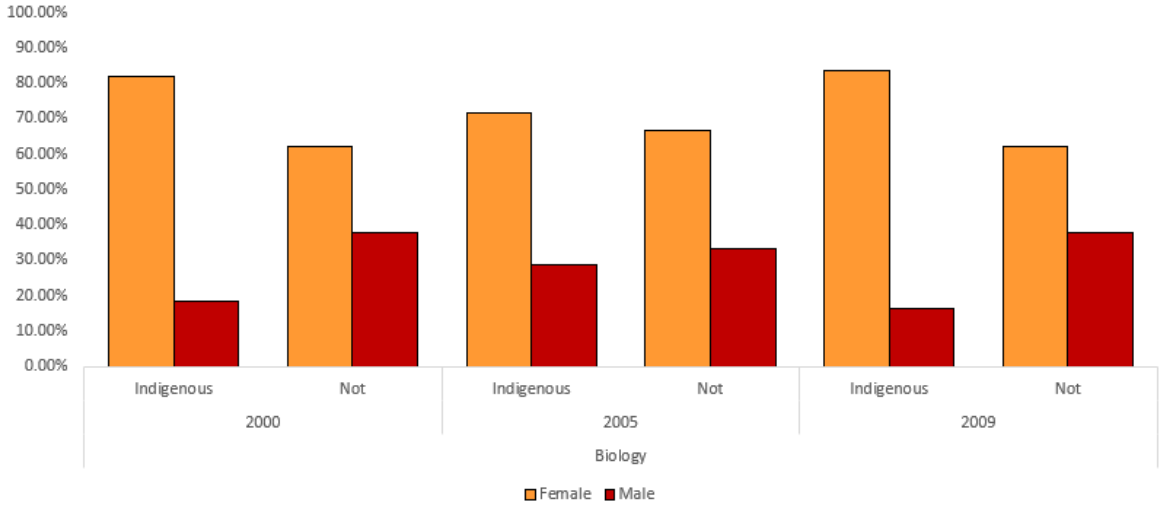
Chart 1.19 - Percentage of degrees awarded in STEM fields by sex and Indigenous status in Canada, from 2000-2009.



Source: NGS 2000-2009

In biology, Indigenous females represented 81.2% degrees awarded to Indigenous people in biology in 2000 (Chart 1.20). This was much higher than for non-Indigenous females, who represented 62.2% of their respective degrees awarded. The proportion of Indigenous females in biology lowered to 71.4% in 2005, and increased to 83.6% in 2009. Non-indigenous females represented 66.8% of degrees awarded in biology to non-Indigenous people in 2005, and 62.2% in 2009.

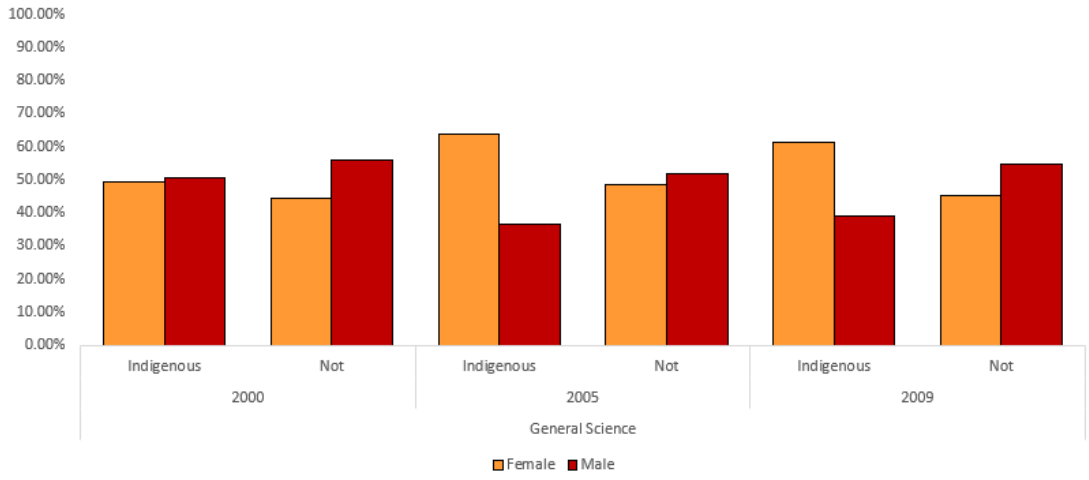
Chart 1.20 - Percentage of degrees awarded in biology by sex and Indigenous status in Canada, from 2000-2009.



Source: NGS 2000-2009

In 2000, the distribution of gender for Indigenous females and non-Indigenous females in general science were very similar, at 49.4% for Indigenous females and 44.2% for non-Indigenous females (Chart 1.21). A larger difference was seen in 2005, when the proportion of Indigenous females rose to 63.6%, while the proportion of non-Indigenous females was 48.4%. In 2009, Indigenous females represented 61.6% of all general science degrees awarded to Indigenous people, while non-Indigenous females represented 45.2%

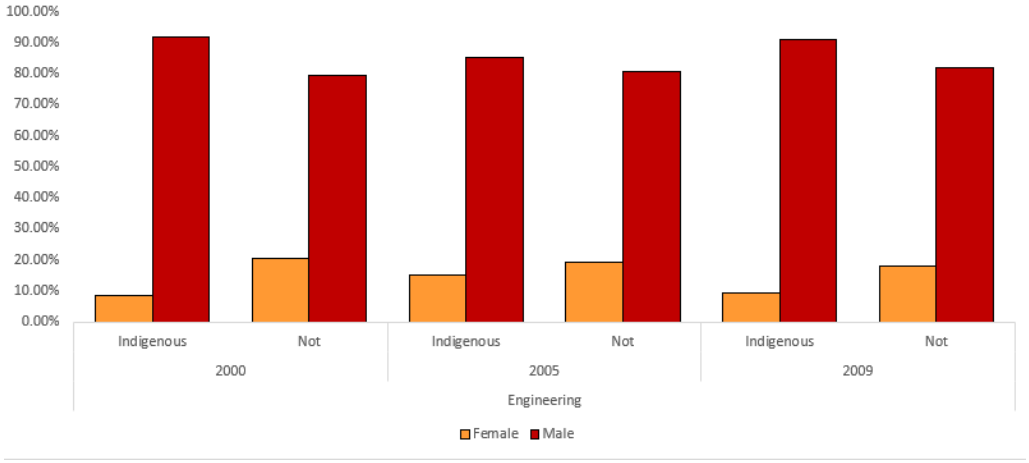
Chart 1.21 - Percentage of degrees awarded in general science by sex and Indigenous status in Canada, from 2000-2009.



Source: NGS 2000-2009

The distribution of gender across degrees awarded was much lower for Indigenous females than for non-Indigenous females in 2000 (Chart 1.22). That year, Indigenous females represented 8.4% of engineering, while non-Indigenous females represented 20.4%. In 2000, the difference was less, with Indigenous females representing 14.9% of all engineering degrees awarded to Indigenous people, while non-Indigenous females represented 19.3%. In 2009, Indigenous females represented 9.2% of degrees awarded to Indigenous peoples, while non-Indigenous females represented 17.9%.

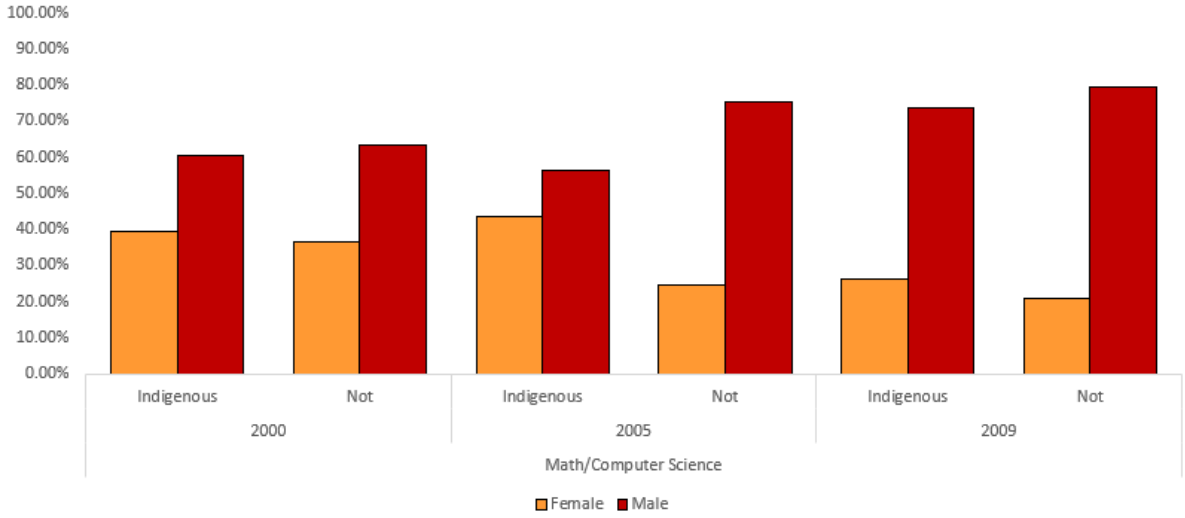
Chart 1.22 - Percentage of degrees awarded in engineering by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-2009

In math/computer science, the distribution of gender for Indigenous and non-Indigenous people was very similar in 2000 (Chart 1.23). That year, Indigenous females represented 43.6% of degrees awarded, while non-Indigenous females represented 36.6% of degrees awarded to non-Indigenous people. In 2009, the proportions were lower, with Indigenous females representing 26.4% of degrees awarded in math/computer science to Indigenous people, while non-Indigenous females represented 20.7% of degrees awarded to non-Indigenous people.

Chart 1.23 - Percentage of degrees awarded in math/computer science by sex and visible minority status in Canada, from 2000-2009.



Source: NGS 2000-20

2. MAJOR FIELD OF STUDY

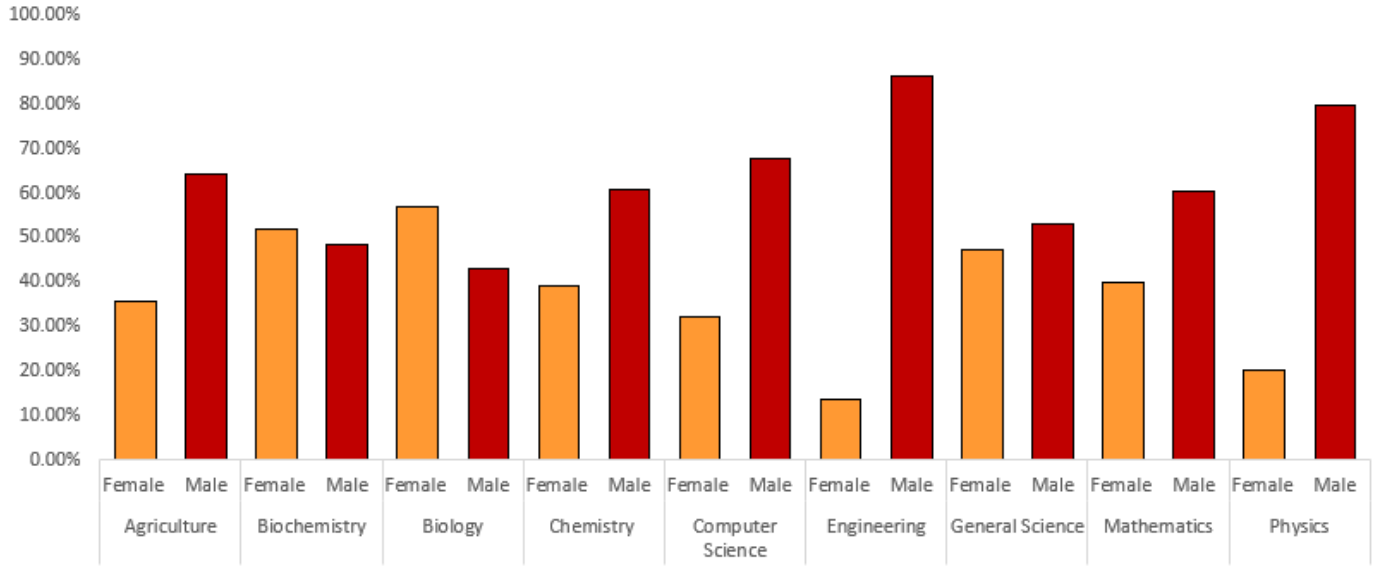
The major field of study is the predominant discipline or area of learning or training of highest completed postsecondary certificate, diploma or degree[3]. It is important to note that this population only includes persons who reported completing or are in the process of completing some form of postsecondary education (including technical trades).

2.1 MAJOR FIELD OF STUDY BY SEX

Major field of study was explored across STEM fields: agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics.

The distribution of gender across major field of study was approximately equal for biochemistry, with females representing 51.7% of those who identified biochemistry as their major field of study, and males representing 48.3%. A similar trend was seen in general sciences, with females representing 47.1% and males 52.9%, and again in biology, with females representing 57.0% of those who identified biology as their major field of study, and males 43.0%. The distribution of males in agriculture was higher than females, at 64.4% for the former, and 35.6% for the latter. Similarly, in chemistry, 60.8% of those who identified their major field of study were males, and 39.2% were females. This data is provided in Chart 2.1

Chart 2.1 - Percentage of major field of study and sex in Canada in 2011



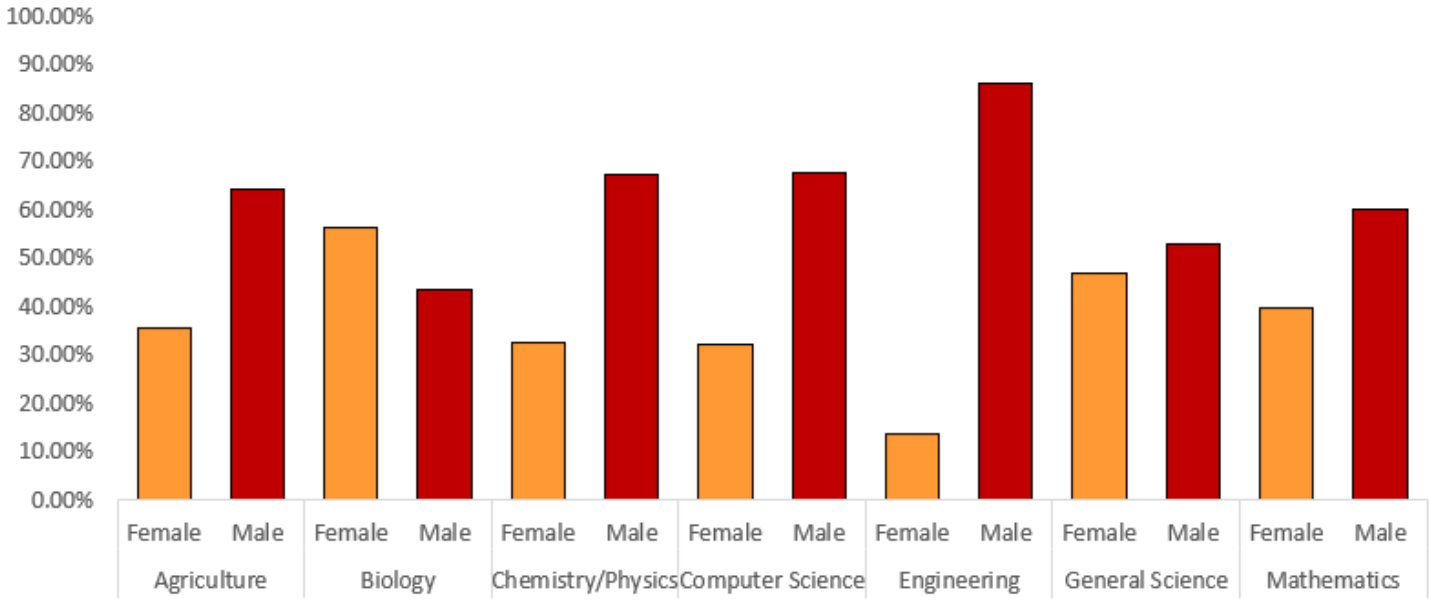
Source: National Household Survey 2011

The largest difference in gender distribution was seen in engineering, where 13.6% of all who identified their major field of study as engineering were female. A similar trend was seen in physics, with females representing 20.3% of those who identified their major field of study as physics.

2.2 MAJOR FIELD OF STUDY BY SEX AND SIX REGIONS

For valid analysis across the regions, it was necessary to combine biochemistry into general science, as well as to combine chemistry and physics into one bin. The chart below (Chart 2.2) shows the distribution across gender for major field of study for all of Canada, with the combined bins, to be used as a tool for comparison across regions and with Canada. Note that the Atlantic provinces include Nova Scotia, New Brunswick, Prince Edward Island and Newfoundland and Labrador, the Prairie provinces include Alberta, Manitoba and Saskatchewan, and the North includes Yukon, the Northwest Territories and Nunavut.

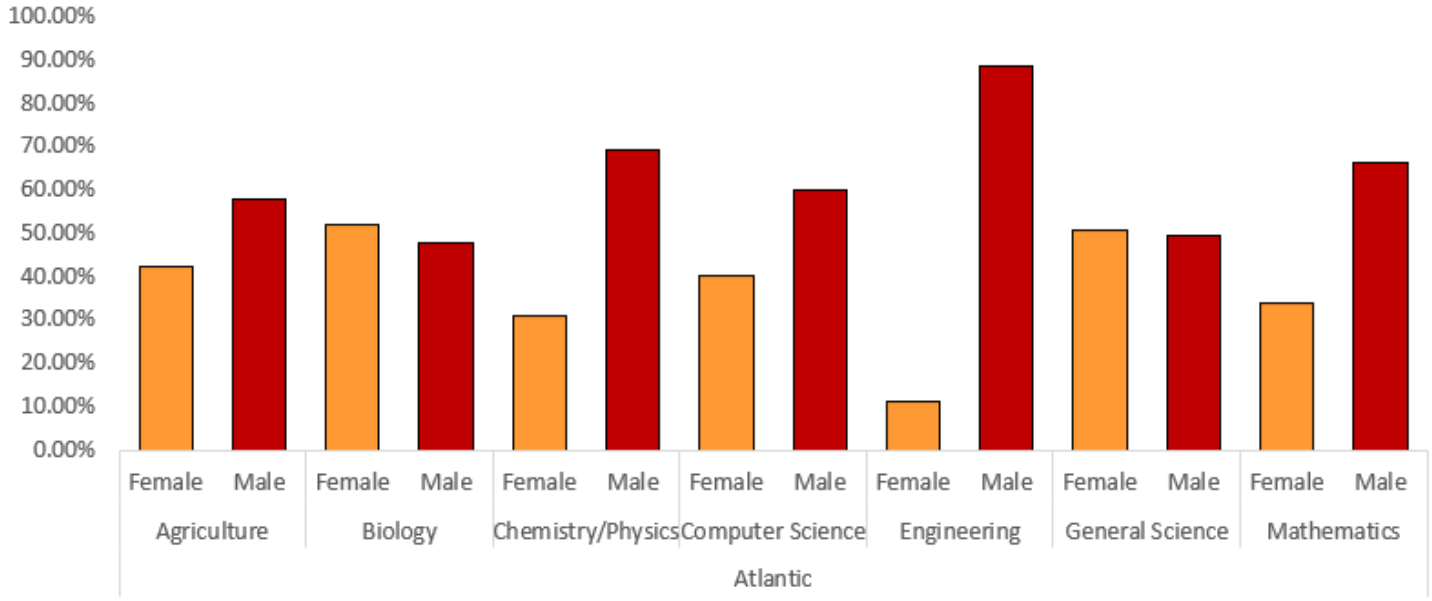
Chart 2.2 - Percentage of major field of study and sex, in Canada in 2011



Source: National Household Survey 2011

In the Atlantic provinces, there was a roughly equal distribution of gender across major field of study for biology and general sciences, with females representing 52.1% of those whose major field of study was biology, and 50.7% of those whose major field of study was general sciences (Chart 2.3). Both were similar to the trends that were seen across Canada. The unequal distribution of gender in engineering was slightly more pronounced in the Atlantic, with females representing 11.3% of those who identified their major field of study as engineering.

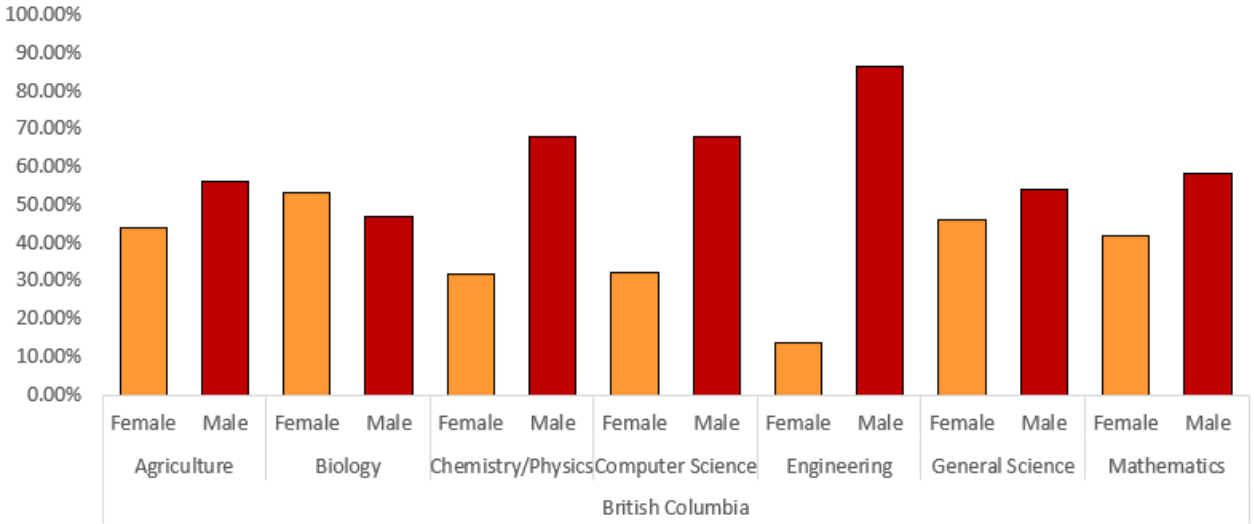
Chart 2.3 - Percentage of major field of study and sex, for Canadians in the Atlantic provinces in 2011



Source: National Household Survey 2011

The distribution of major field of study across gender for British Columbia was very similar to the distribution across all of Canada (Chart 2.4). As in Canada, the distribution of biology and general science were close to equal for males and for females. Women represented 52.3% of those who identified biology as their major field of study, and 46.0% of those who identified general science as their major field of study. The distribution of gender was also almost the same for those who identified agriculture as their major field of study – an increase from the trend seen across Canada. As in all of Canada, women who identified engineering as their major field of study was the lowest of all the programs, at 13.6%.

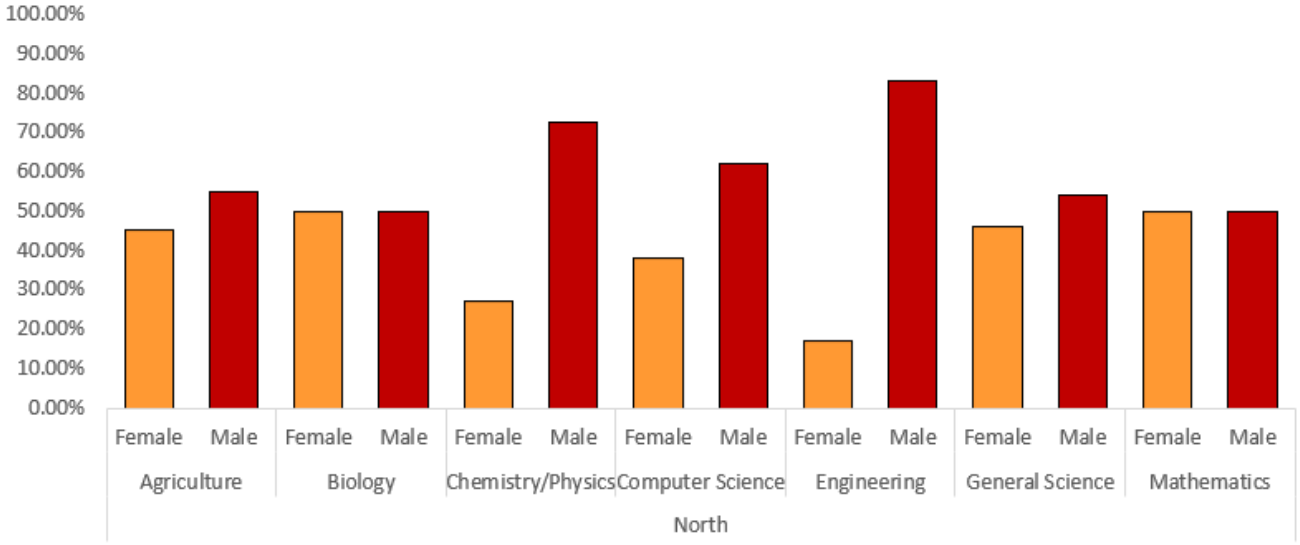
Chart 2.4 - Percentage of major field of study and sex, for Canadians in British Columbia in 2011



Source: National Household Survey 2011

The gender distribution in the Northern provinces showed slight differences in distributions across a few programs in comparison to the country-wide trend (Chart 2.5). The distribution of those who identified agriculture and mathematics as their major field of study was approximately the same for each gender, with females representing 45.0% of the respondents in agriculture and 50.0% in mathematics. This is higher than what was reported for all of Canada. Conversely, women represent 27.3% of those who reported their major field of study to be physics. This is lower than what was reported for all of Canada. The gender distribution for biology, computer science, general science and engineering were all close to the national trends.

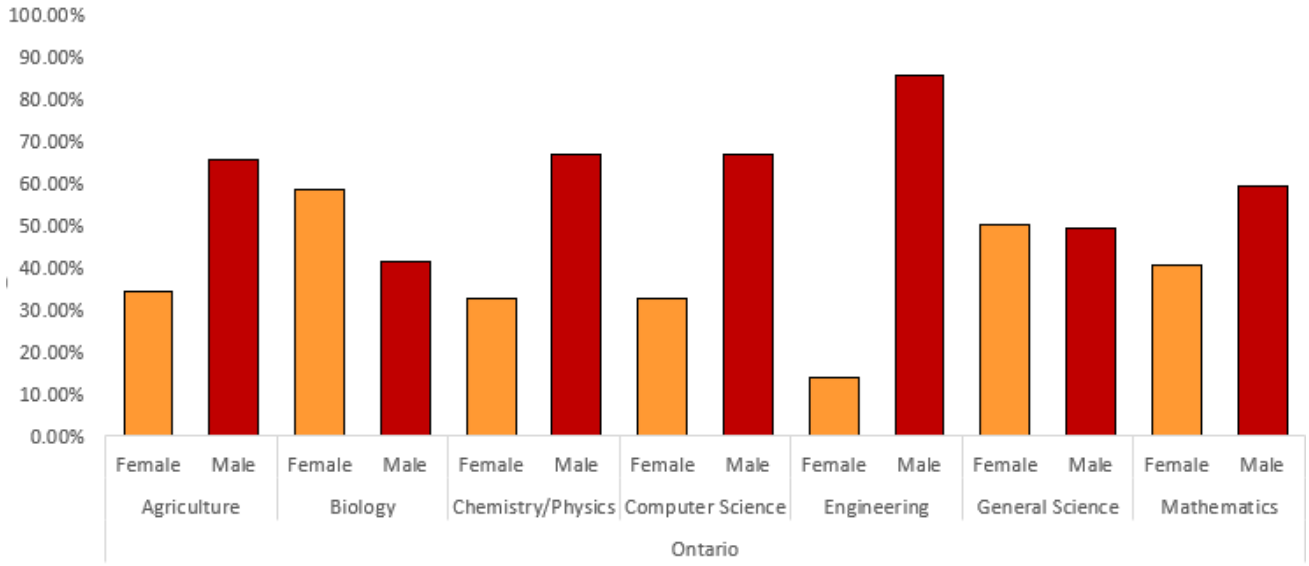
Chart 2.5 - Percentage of major field of study and sex, for Canadians in the North in 2011



Source: National Household Survey 2011

The gender distribution of STEM fields in Ontario was very similar to the gender distribution for all of Canada (Chart 2.6). Biology and general sciences showed an approximately equal gender distribution. For agriculture, chemistry/physics and computer science, females represented about a third of those who reported those programs as their major field of study. For example, females represented 34.3% of all those who identified agriculture as their major field of study, and 32.8% of those who identified chemistry/physics as their major field of study. Females were the least represented in engineering, with 14.0% of those who identified that field as their major field of study.

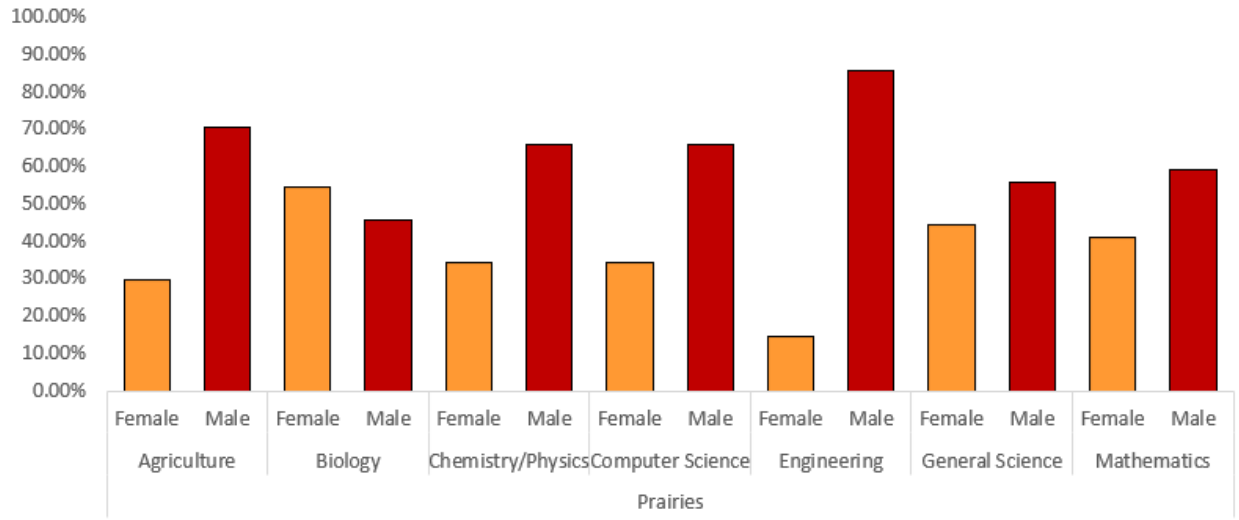
Chart 2.6 - Percentage of major field of study and sex, in Ontario in 2011



Source: National Household Survey 2011

Like Ontario, the gender distribution for the Prairies was very similar to the gender distribution across major fields of study for all of Canada (Chart 2.7). Biology and general science were again approximately evenly distributed. However, females were slightly less represented in agriculture, at 29.5%, compared to 35.6% for the entire country. As in all of Canada, engineering had the smallest proportion of females, with 14.5% identifying engineering as their major field of study.

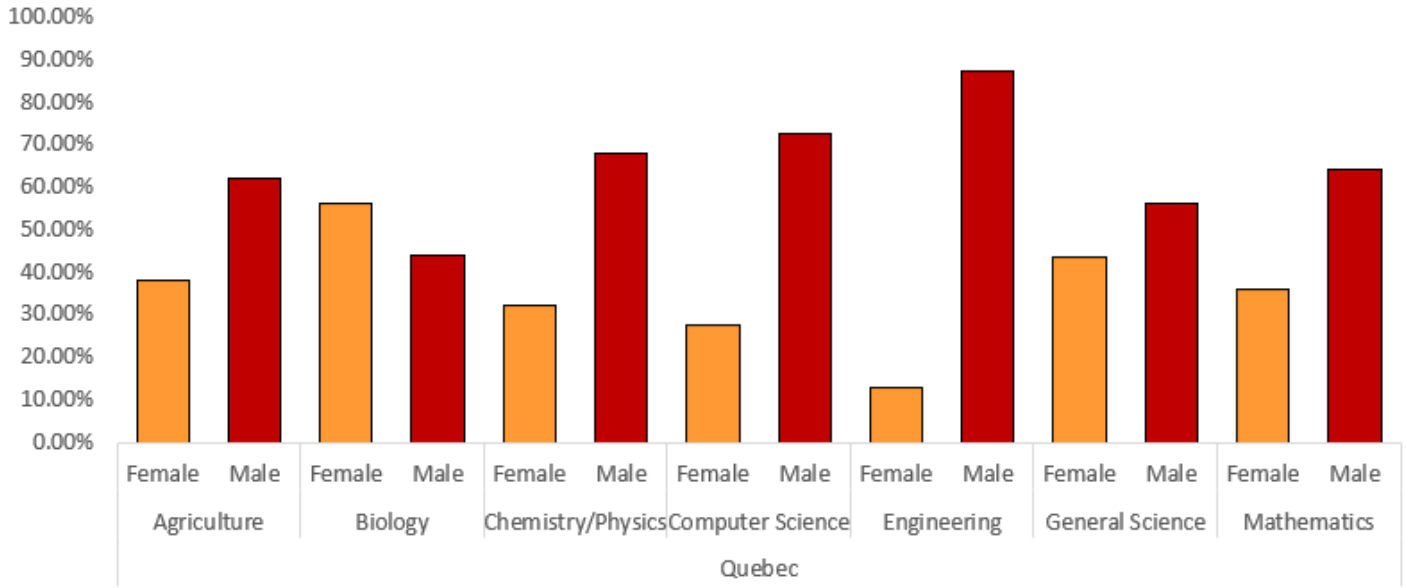
Chart 2.7 - Percentage of major field of study and sex, for Canadians Prairie provinces in 2011



Source: National Household Survey 2011

In Quebec, the gender distribution was again very similar to the gender distribution across major field of study for all of Canada (Chart 2.8). Biology and general science were approximately evenly distributed, with females representing 56.2% of those who identified their major field of study as biology, and 43.7% in general science. Again, engineering had the smallest proportion of females, with 12.7% identifying engineering as their major field of study.

Chart 2.8 - Percentage of major field of study and sex, in Quebec in 2011



Source: National Household Survey 2011

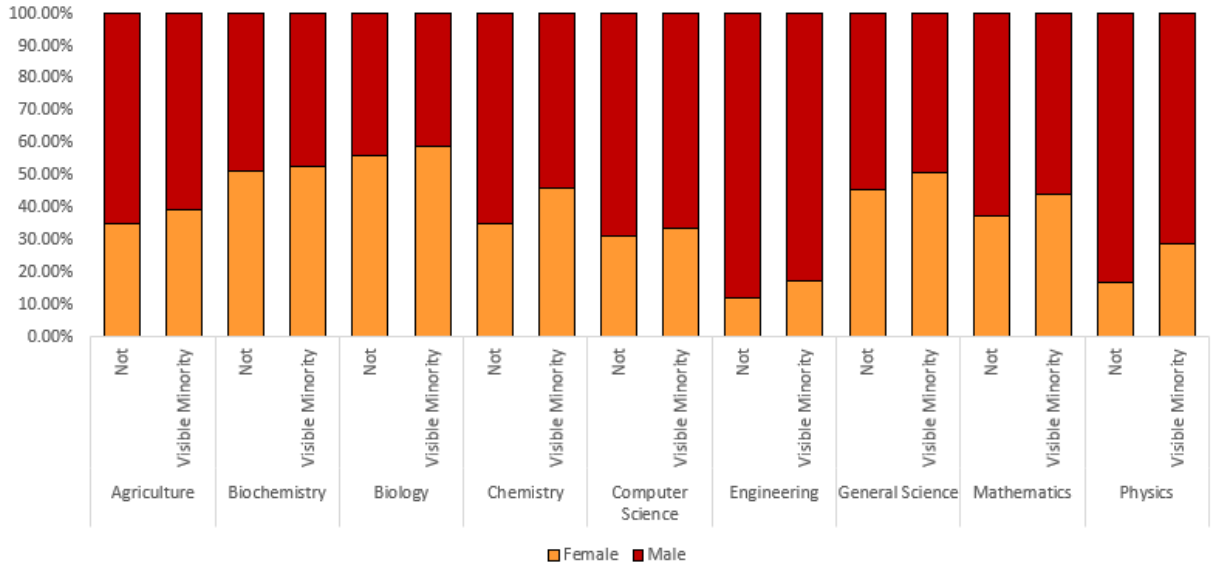
2.3 MAJOR FIELD OF STUDY BY SEX AND VISIBLE MINORITY STATUS

The visible minority status of a person is defined as a person, other than Aboriginal peoples, who is non-Caucasian in race or non-white in color[4].[!]This variable was explored across all Canadians who identified their major field of study as one of the STEM fields of interest; agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics.

Major field of study was explored across STEM fields: agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics, across visible minority status.

The distribution of those who identify as being visible minorities and non-visible minorities, followed relatively similar trends for certain STEM fields (Chart 2.9). For both biology, biochemistry and general science, the distribution of gender was approximately equal. About 40% of those who reported agriculture as their major field of study were female for both visible minorities and non-visible minorities. As well, the distribution of females in engineering and computer science was low for both those who identified as visible minorities and those who didn't, at approximately 30% for computer science and less than 20% for engineering.

Chart 2.9 - Percentage of major field of study, sex and visible minority status, in Canada 2011



Source: National Household Survey 2011

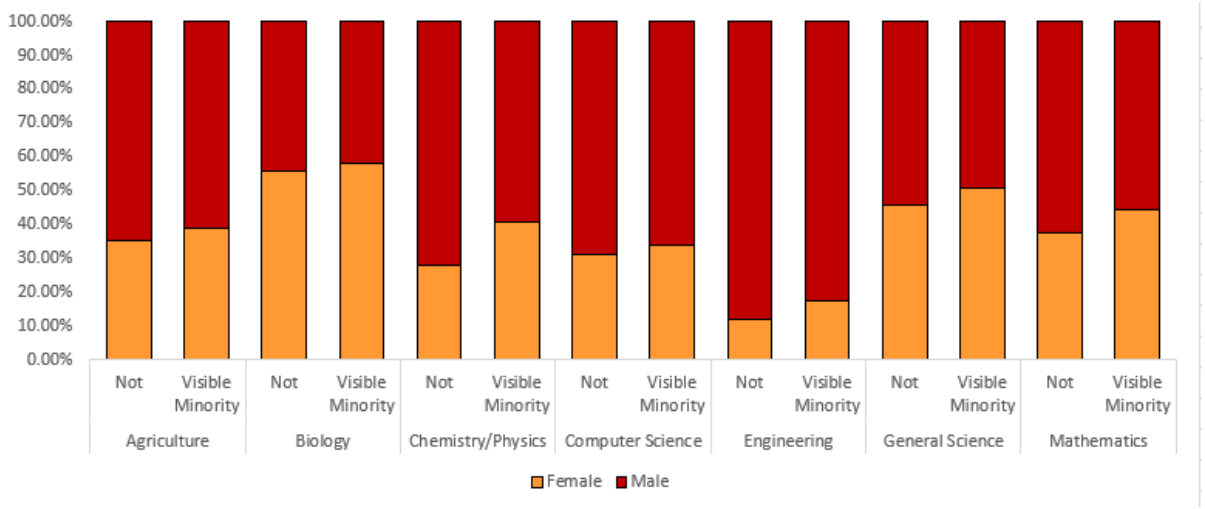
There were a few STEM fields that did differ in gender distribution across visible minority status. In chemistry, females represented approximately 45% of visible minorities. This rate was lower in those that did not identify as visible minorities, at approximately 34%. As well, in physics, the distribution of females who identified as visible minorities and whose field of study was physics was approximately 28%, and only 16% for those who did not identify as a visible minorities.

2.4 MAJOR FIELD OF STUDY BY SEX, VISIBLE MINORITY STATUS AND FIVE REGIONS

For valid analysis across the regions, it was necessary to combine biochemistry into general science, and to also combine physics and chemistry into one category. The chart below (Chart 2.10) shows the distribution of gender across visible minority status for all of Canada with the combined STEM categories, for ease of comparison across regions.

There were not enough observations in North for the subpopulation of those who identified as visible minorities or not to provide valid interpretations, so the North was excluded from the subsequent analysis.

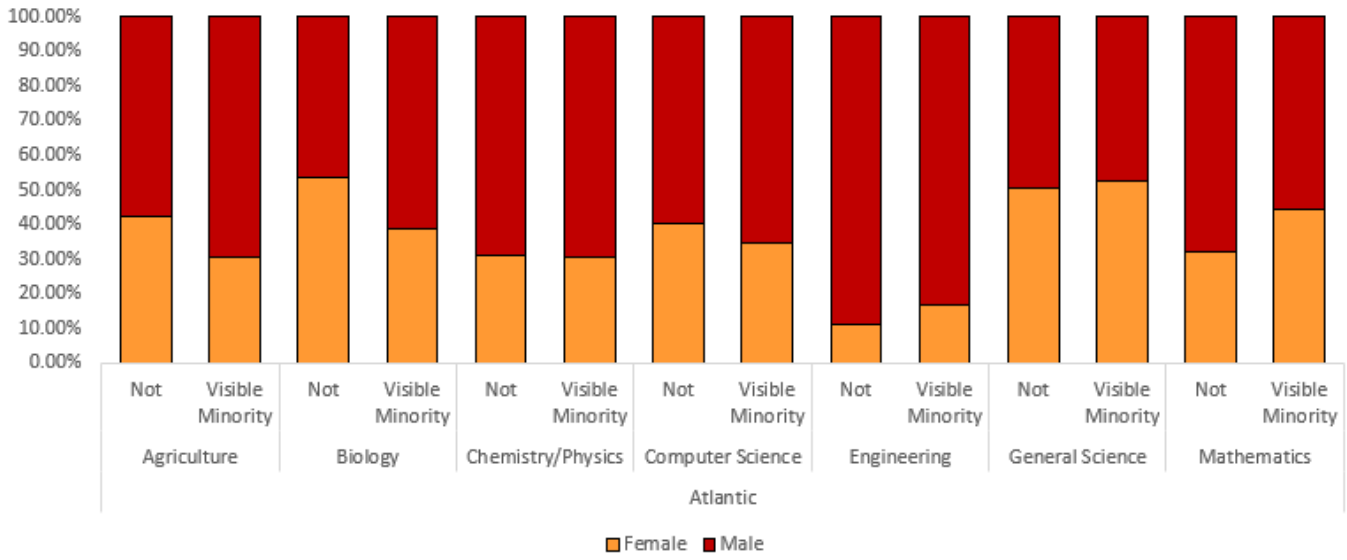
Chart 2.10 - Percentage of major field of study, sex and visible minority status, in Canada 2011



Source: National Household Survey 2011

The distribution in the Atlantic provinces of gender for those who identified as visible minorities and those who did not was almost the same for those who claimed chemistry/physics and general science as their major field of study (Chart 2.11). For example, females represented 31.0% of those who identified chemistry/physics as their major field of study for both visible minorities and those who were not visible minorities. The proportion of females in engineering and mathematics was higher for visible minorities, with females representing 16.9% of those who identified engineering as their major field of study, and only 11.0% for females who were not visible minorities. The difference was larger in mathematics, with female visible minorities representing 44.0% of those whose major field of study was mathematics, and 32.0% for females who were not visible minorities. Large differences were also seen in agriculture and biology, with female visible minorities representing fewer of those who identified those programs as their major field of study. For example, visible minority females represented 38.8% of biology major field of study and 53.5% for females who were not visible minorities.

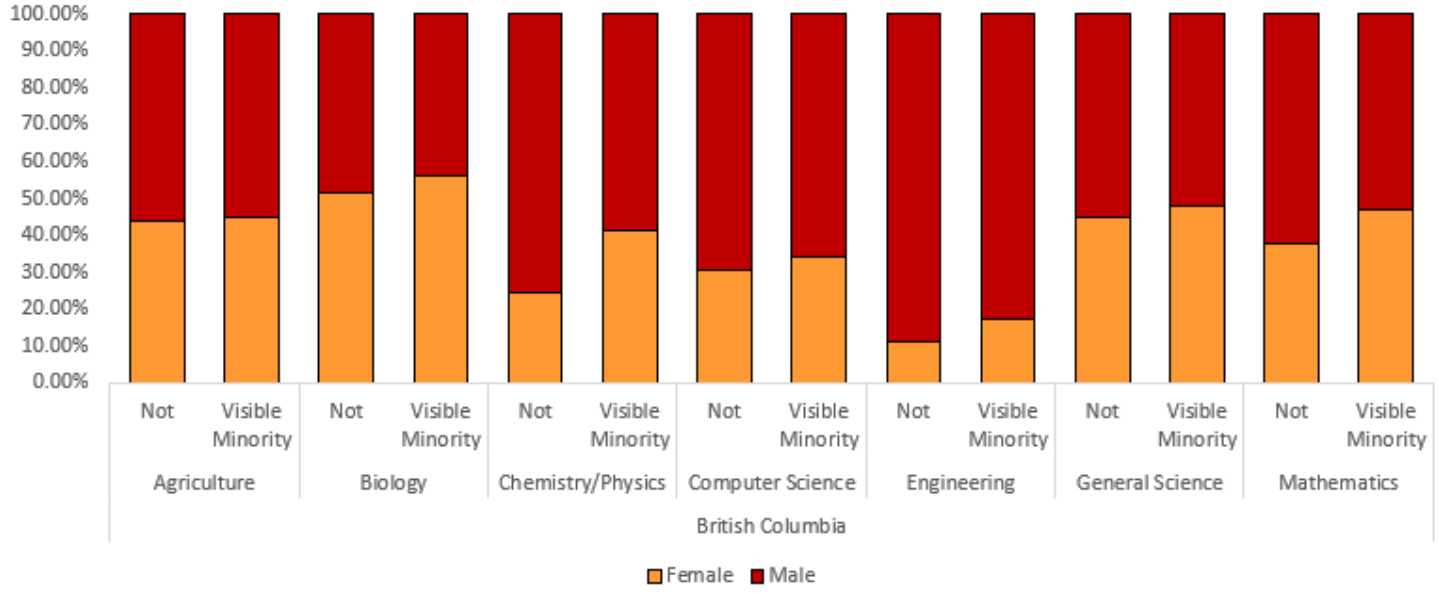
Chart 2.11 - Percentage of major field of study, sex and visible minority status, in the Atlantic provinces in 2011



Source: National Household Survey 2011

In British Columbia, the distribution of gender for visible minorities and those who are not, was relatively similar for agriculture, biology, computer science and general science (Chart 2.12). Visible minority females represented 43.9% of those who identified agriculture as their major field of study, and 43.6% for females who were not visible minorities. It is interesting to note that the gender distribution for agriculture was much more equal in British Columbia than for all of Canada (proportion of females in agriculture in Canada was approximately 37% for visible minorities and those who were not). In biology, visible minority females represented 55.9% of the major field of study, and 51.6% for females who were not visible minorities. A much larger difference was seen for females who identified chemistry/physics as their major field of study, with female visible minorities representing 41.5% of major field of study, and females who were not visible minorities at 24.3%.

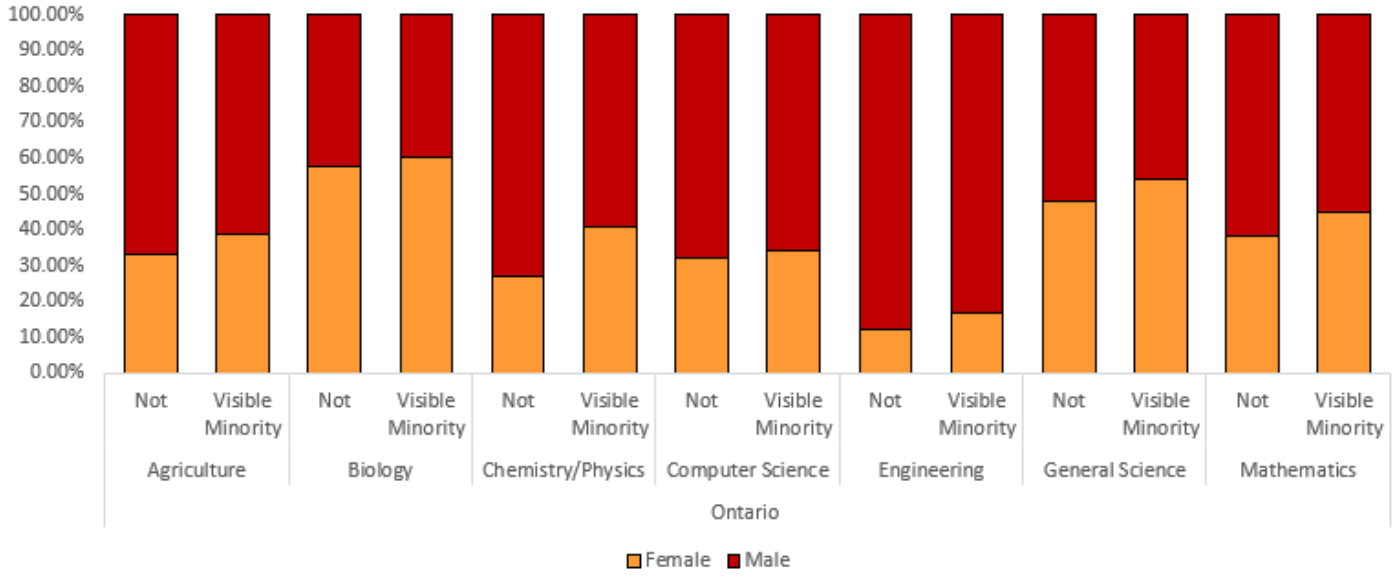
Chart 2.12
Percentage of major field of study, sex and visible minority status, in British Columbia in 2011



Source: National Household Survey 2011

As in British Columbia, the distribution of gender for visible minorities and those who were not was relatively similar in Ontario for those who identified agriculture, biology, computer science and general science as their major field of study (Chart 2.13). For example, visible minority females represented 34.2% of those who identified computer science as their major field of study, and 32.1% for females who were not visible minorities. The largest differences were seen in mathematics and chemistry/physics. Visible minority females represented 44.7% of those who identified mathematics as their major field of study, and 38.2% for females who were not visible minorities. In chemistry/physics, females represented 40.8% of visible minorities, but females were only 27.1% of those who were not visible minorities.

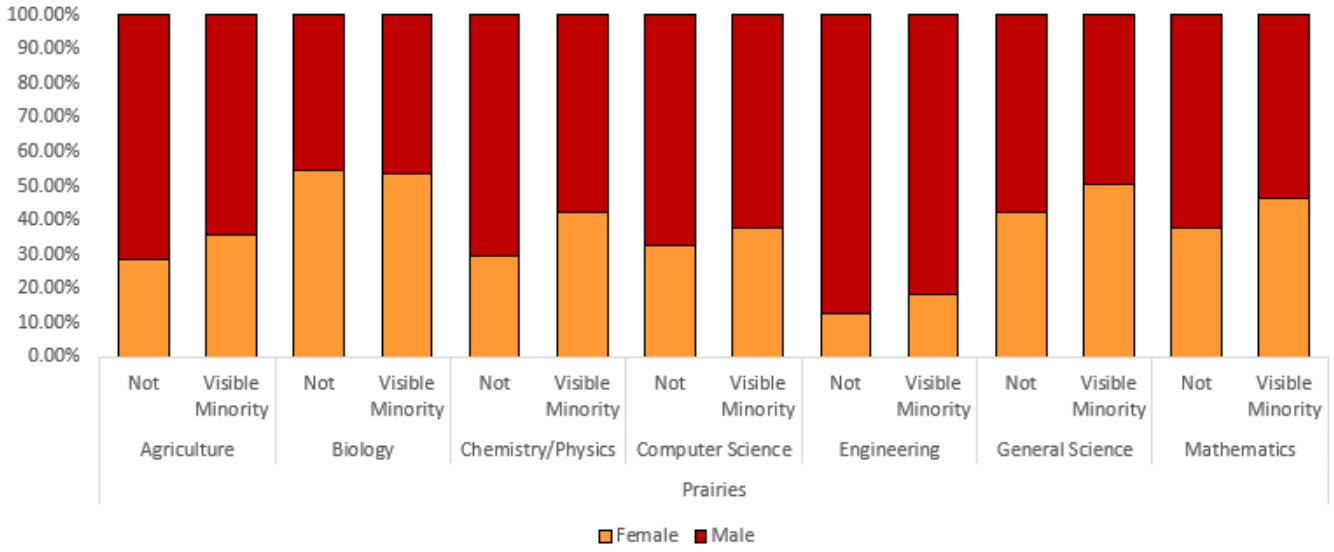
Chart 2.13 - Percentage of major field of study, sex and visible minority status, in Ontario in 2011



Source: National Household Survey 2011

The distribution of gender for visible minorities and those who are not in the Prairies, was relatively similar for agriculture, biology, computer science (Chart 2.14). Visible minority females represented 50.5% of those who identified general science as their major field of study, and 42.5% for females who were not visible minorities. This was a slightly larger difference than was seen for all of Canada. The largest difference was seen in chemistry/physics, where female visible minorities represented 42.6%, and females who were not visible minorities in chemistry/physics represented 29.5%..

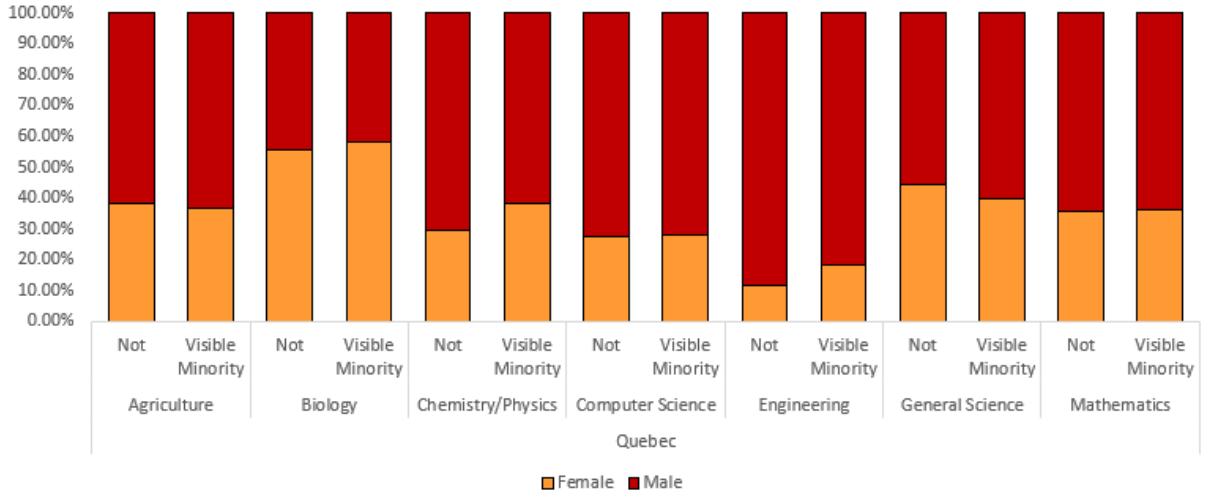
Chart 2.14- Percentage of major field of study, sex and visible minority status, in the Prairies in 2011



Source: National Household Survey 2011

Overall, in Quebec, the distributions of gender for visible minorities and those who were not visible minorities showed fewer differences than for the distributions for the rest of Canada (Chart 2.15). For example, in agriculture, the distribution of visible minority females was 38.2% and was 38.0% for females who were not visible minorities. Even for chemistry/physics, the difference between the two distributions was less than half of the difference for all of Canada. Visible minority females represented 38.5% of those visible minorities who identified chemistry/physics as their field of major study, and 29.8% for females who were not visible minorities.

Chart 2.15 - Percentage of major field of study, sex and visible minority status, in Quebec in 2011



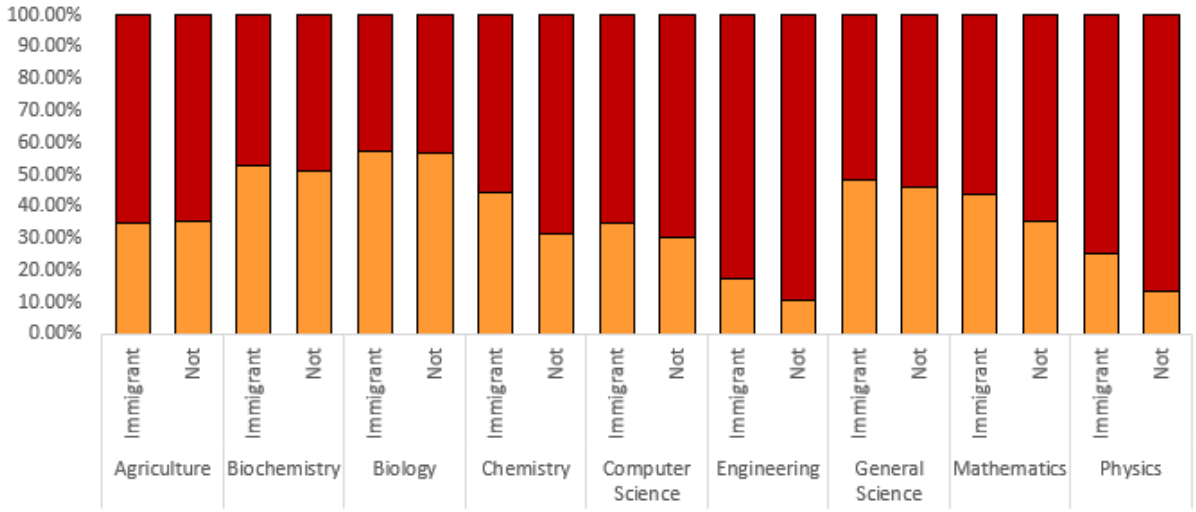
Source: National Household Survey 2011

2.5 MAJOR FIELD OF STUDY BY SEX AND IMMIGRATION STATUS

Immigrant refers to a person who is or has ever been a landed immigrant/permanent resident. This person has been granted the right to live in Canada permanently by immigration authorities[3]. This variable was explored across all Canadians who identified their major field of study as one of the STEM fields of interest; agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics.

The distribution of gender across immigration status was similar for certain STEM fields (Chart 2.16). For biochemistry, biology and general science, the distribution of gender for immigrants and non-immigrants was approximately equal for both. For example, female immigrants represented 52.8% of immigrants who identified biochemistry as their major field of study, while non-immigrant females represented 51.2%. For agriculture and computer science, women represented approximately 35% of the gender distribution for both immigrants and non-immigrants.

Chart 2.16 - Percentage of major field of study, sex and immigration status, in Canada in 2011



Source: National Household Survey 2011

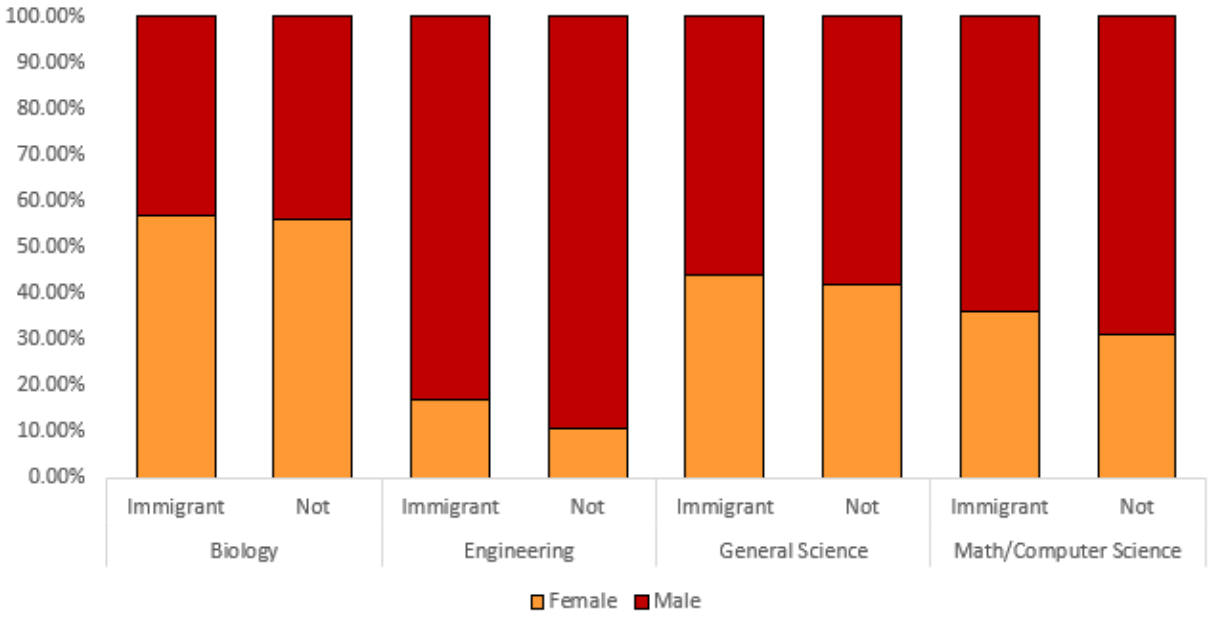
The distributions did differ for chemistry- approximately 44% of immigrants who identified their field of study as chemistry were female. For non-immigrants, 31% of females identified chemistry as their field of study. In physics, 13% of the non-immigrants were female, with this number much higher for immigrants, at 25%.

2.6 MAJOR FIELD OF STUDY BY SEX, IMMIGRATION STATUS AND SIX REGIONS

For valid analysis across the regions, it was necessary to combine biochemistry, chemistry and physics into general science, and to combine math and computer science. As well, agriculture was dropped, since the number of observations in each cell was too low to produce reliable estimates.

The distribution of immigrants and non-immigrants across gender was approximately equal for both general science and biology (Chart 2.17). Approximately 36% of those whose field of study was math/computer science were female immigrants, with 31% for female non-immigrants. For women in engineering, approximately 17% were immigrants and 10% non-immigrant.

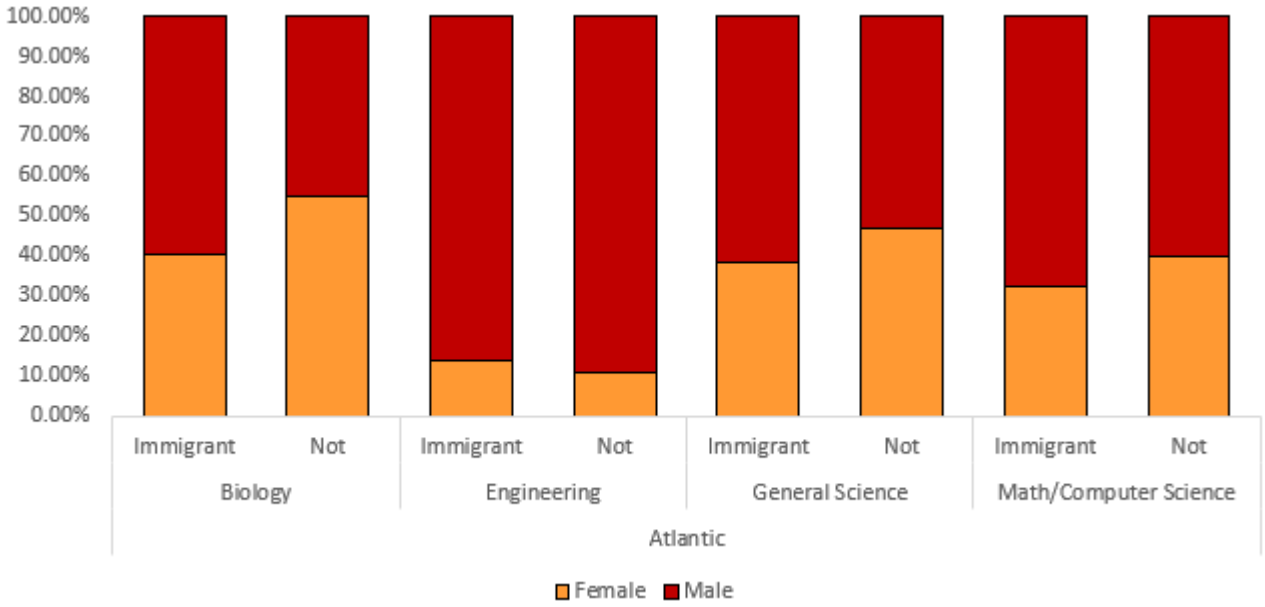
Chart 2.17 - Percentage of major field of study, sex and immigration status, in Canada in 2011



Source: National Household Survey 2011

In the Atlantic provinces, the trends in gender distribution of immigrants and non-immigrants were almost all opposite to the ones seen in all of Canada (Chart 2.18). There were fewer immigrant females who identified biology as their major field of study, at 40.4%, compared to 54.88% for non-immigrant females. As well, in general sciences, there were fewer immigrant females at 38.2%, compared to 46.9% for non-immigrant females. Finally, in math/computer science, immigrant females represented 32.1% of immigrants who identified math/computer science as their major field of study, while non-immigrants represented 40.0%.

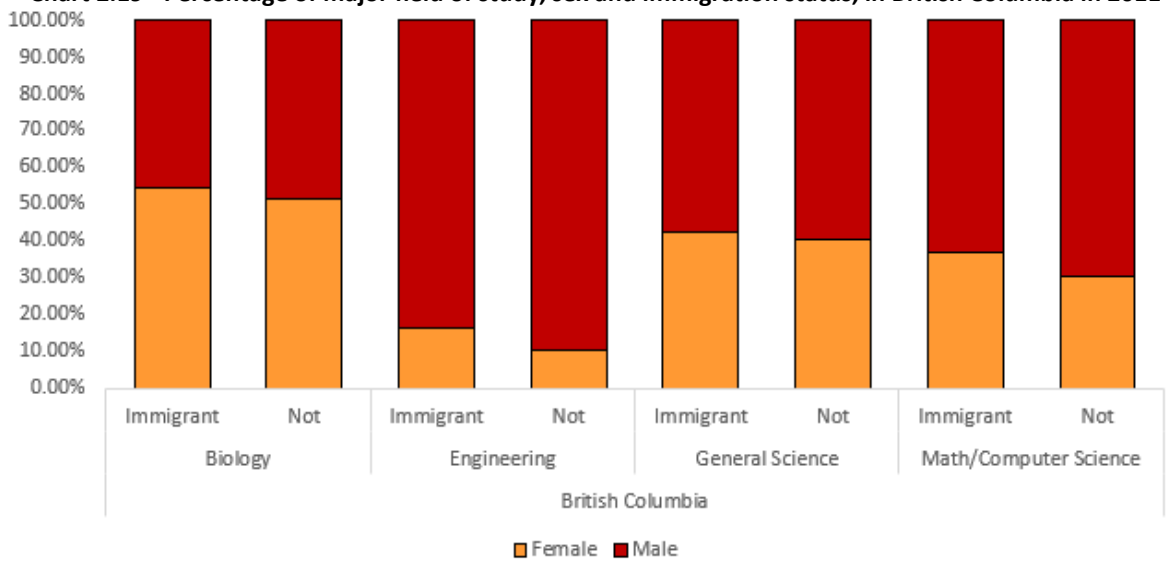
Chart 2.18 - Percentage of major field of study, sex and immigration status, in the Atlantic provinces in 2011



Source: National Household Survey 2011

In British Columbia, the distribution of gender for immigrants and non-immigrants were almost the same for biology and general sciences (Chart 2.19). For example, female immigrants represent 42.4% of immigrants who identified general science as their major field of study, while non-immigrant females represent 40.3% of non-immigrants. A larger difference was seen in math/computer science, where female immigrants represent 37.1% of immigrants in math/computer science, while non-immigrant females represent 30.1%.

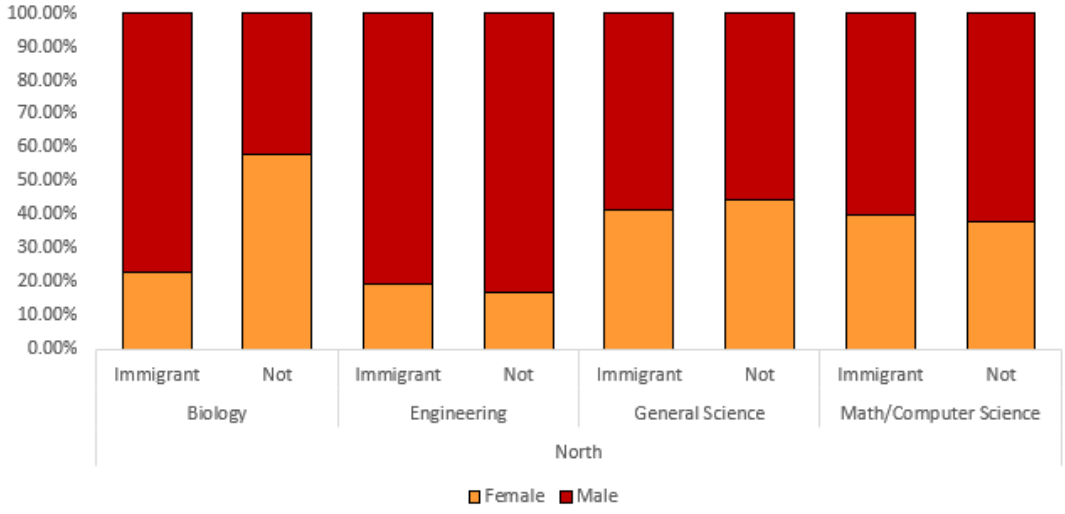
Chart 2.19 - Percentage of major field of study, sex and immigration status, in British Columbia in 2011



Source: National Household Survey 2011

In the North, the distribution of gender for immigrants and non-immigrants was approximately the same for engineering, general science and math/computer science (Chart 2.20). This differed from the trend seen in Canada, where more immigrant females were seen in engineering and math/computer science. For the North, immigrant females represented 40.0% of immigrants who identified math/computer science and their major field of study, while non-immigrants represent 37.7%. The largest difference was seen in biology, where there were much fewer immigrant females in the North compared to the rest of Canada. Immigrant females represent 23.1% of immigrants who identified biology as their major field of study, while non-immigrants represented 58.2%.

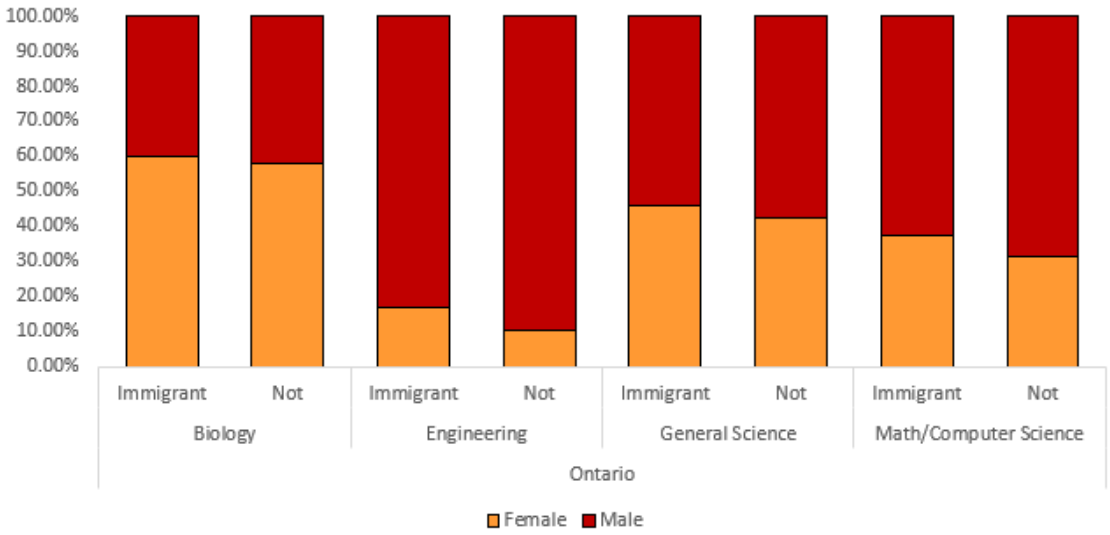
Chart 2.20 - Percentage of major field of study, sex and immigration status, in the North in 2011



Source: National Household Survey 2011

In Ontario, the distribution of gender for immigrants and non-immigrants was very similar for biology and general science (Chart 2.21). Immigrant females represented 59.8% of immigrants who identified biology as their major field of study, while non-immigrant females represented 57.7%. The largest difference between the two distributions was seen in engineering, where non-immigrant females represented 10.1% and immigrant females represented 17.0%.

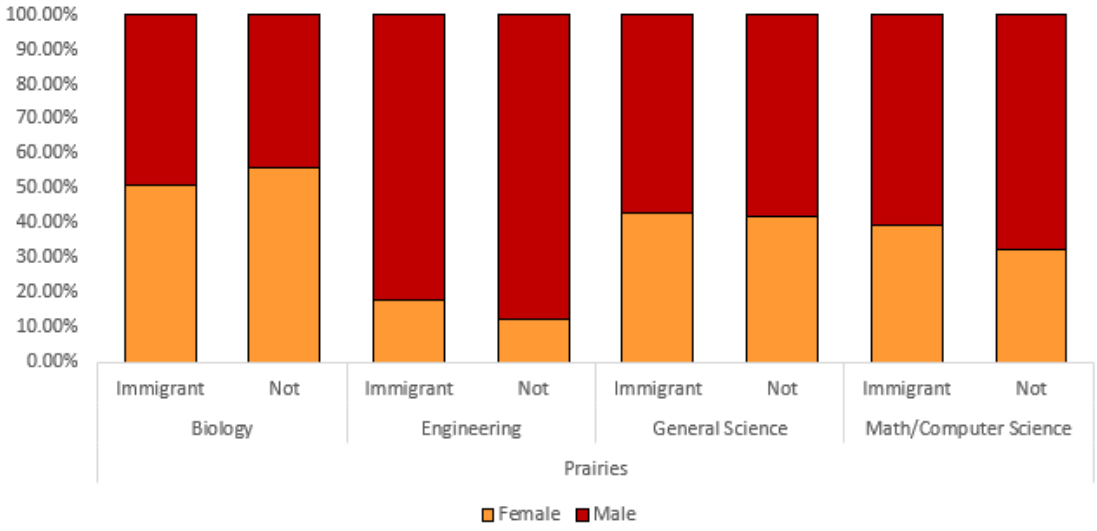
Chart 2.21 - Percentage of major field of study, sex and immigration status, in Ontario in 2011



Source: National Household Survey 2011

The distribution of gender for immigrants and non-immigrants in the Prairies was very similar to the distribution for the rest of Canada (Chart 2.22). Immigrant females who identified general science as their major field of study represented 50.8% of all immigrants in biology, while non-immigrant females represented 55.7%. The largest difference was seen in math/computer sciences, where immigrant females represented 39.4% of all immigrants in that field, and non-immigrant females represented 32.4%.

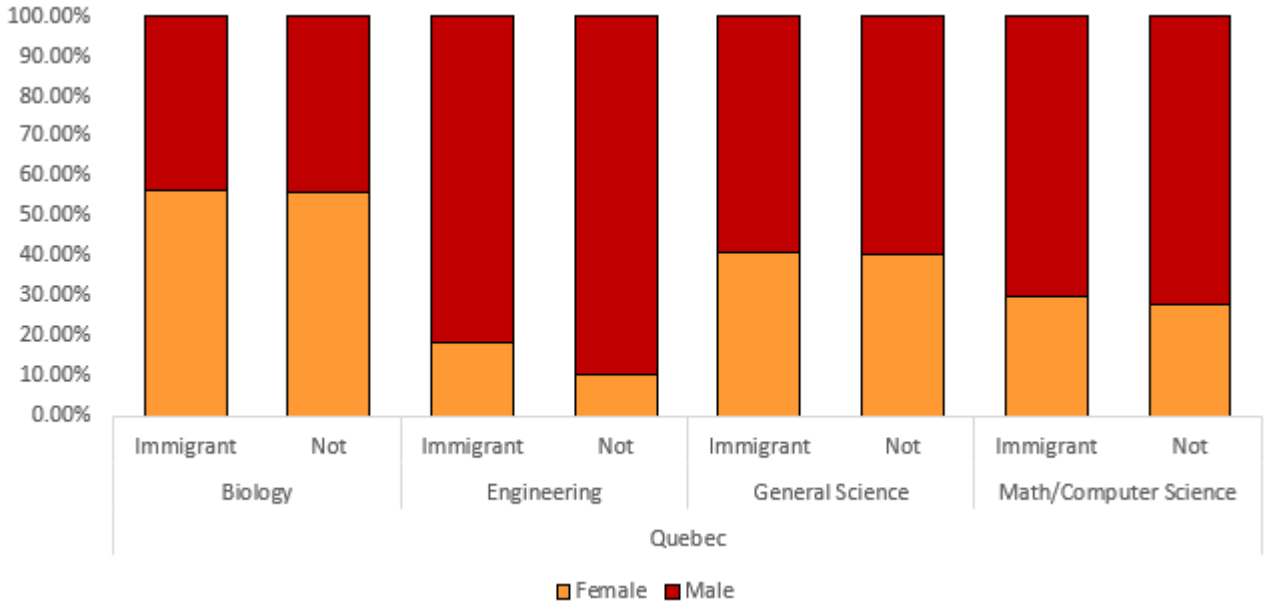
Chart 2.22 - Percentage of major field of study, sex and immigration status, in the Prairies in 2011



Source: National Household Survey 2011

In Quebec, the distribution of gender for immigrants and non-immigrants was almost the same for biology, general science and math/computer science (Chart 2.23). For example, immigrant females represented 56.4% of all immigrants in biology, while non-immigrant females represent 56.0%. The largest difference was seen in engineering. Immigrant females represented 18.2% of immigrants who identified engineering as their major field of study, while non-immigrant females represented 10.5%.

Chart 2.23 - Percentage of major field of study, sex and immigration status, in Quebec in 2011



Source: National Household Survey 2011

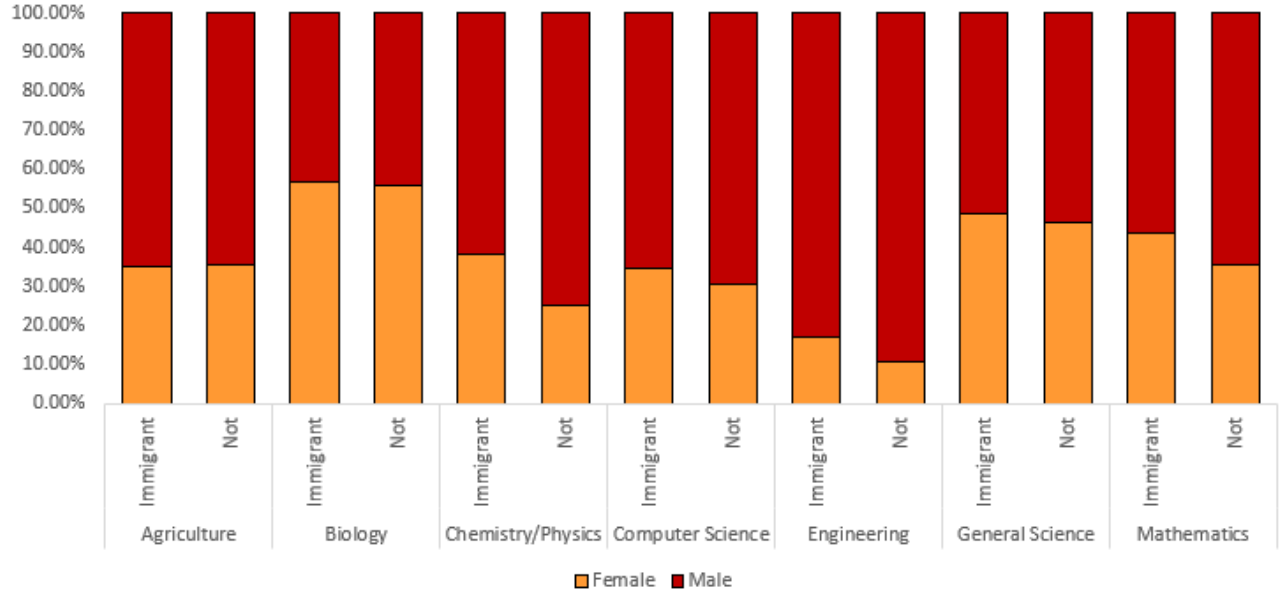
2.7 MAJOR FIELD OF STUDY BY SEX, IMMIGRATION STATUS AND FIVE REGIONS

Since there were few observations in the North, is was necessary to combine the programs into a few bins (biology, engineering, general science and math/computer science) to conduct reliable analyses. In order to investigate the programs in more detail, an analysis was also conducted with the observations from the North excluded. It is important to note that the underlying population has now changed from all Canadians who reported being immigrant or non-immigrant who identified their major field of study as one of the STEM fields of interest; agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics, to Canadians (excluding the North) who reported being immigrants or non-immigrants and identified their major field of study as one of the STEM fields of interest.

For valid analysis across the regions, it was necessary to combine biochemistry into general science, and to also combine physics and chemistry into one category. The plot below shows the distribution of gender across visible minority status for all of Canada with the combined STEM categories, for ease of comparison across regions.

The distribution of immigrants and non-immigrants across gender was approximately equal for both general sciences and biology (Chart 2.24). Approximately 36% of those whose field of study was math/computer science were female immigrants, with 31% for non-immigrants. For women in engineering, there were approximately 17% immigrant and 10% non-immigrant.

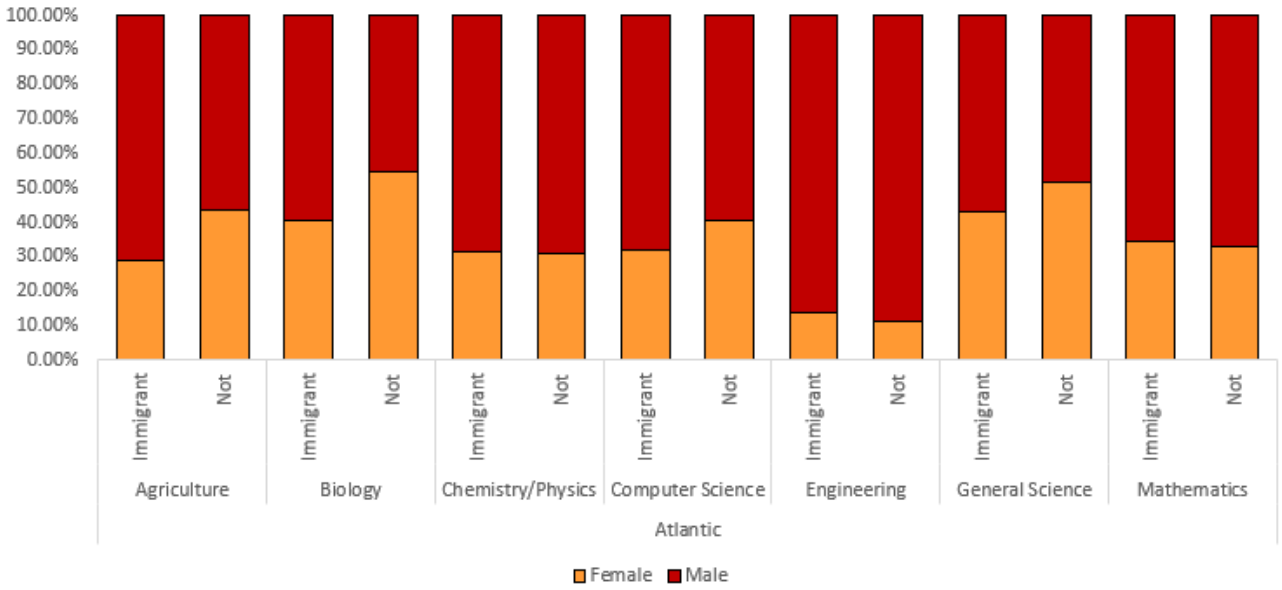
Chart 2.24 - Percentage of major field of study, sex and visible minority status, in Canada (minus the North) in 2011



Source: National Household Survey 2011

In the Atlantic provinces, the distribution of gender for immigrants and non-immigrants differed in comparison to the distribution for all of Canada (Chart 2.25). The distributions were very similar for mathematics and chemistry/physics. Immigrant females represented 34.6% of immigrants in mathematics, while non-immigrant females represented 33.0% of non-immigrants in mathematics. There were large differences seen in biology and agriculture. Immigrant females in biology represented 40.4% of all immigrants in biology, while non-immigrant females represented 54.9%.

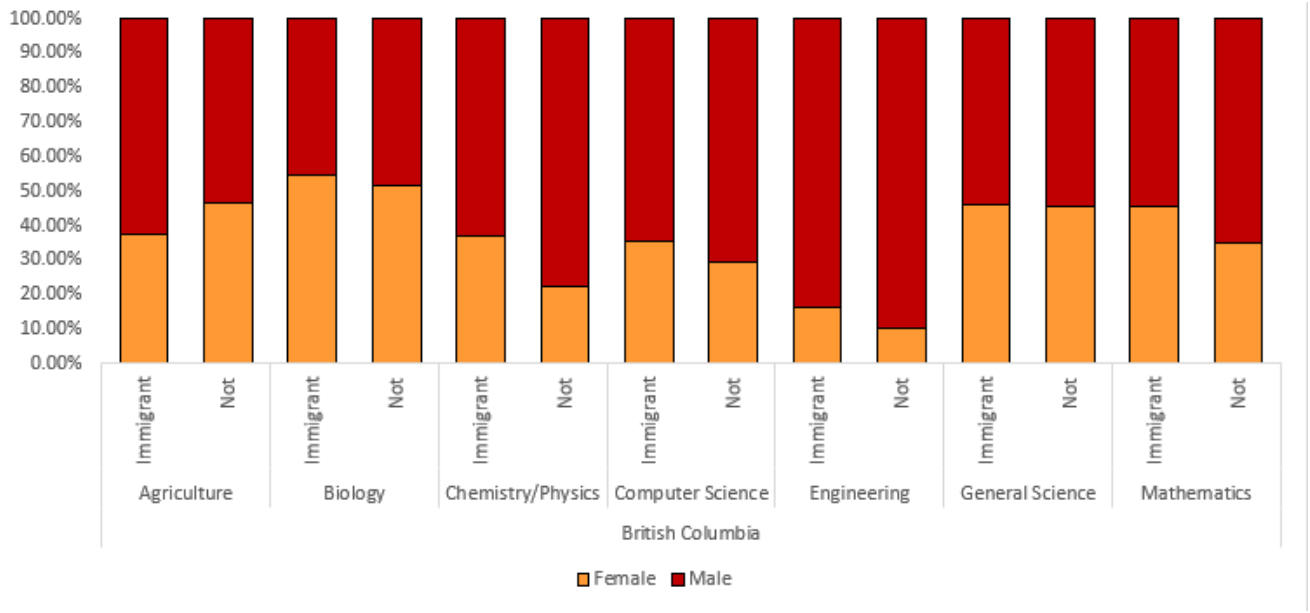
Chart 2.25 - Percentage of major field of study, sex and immigration status, in the Atlantic provinces (minus the North) in 2011



Source: National Household Survey 2011

In British Columbia, the distribution of gender for immigrants and non-immigrants was very similar to the distribution for the rest of Canada (Chart 2.26). The distributions were approximately the same for immigrants and non-immigrants in general science and biology. However, there was a difference in the distribution of agriculture in British Columbia. Immigrant females represented 37.7% of immigrants who identified agriculture as their major field of study, while non-immigrant females represented 46.7%. The largest differences were seen in mathematics and chemistry/physics. Immigrant females in chemistry/physics represented 37.1% of immigrants, while non-immigrant females represented 22.5%.

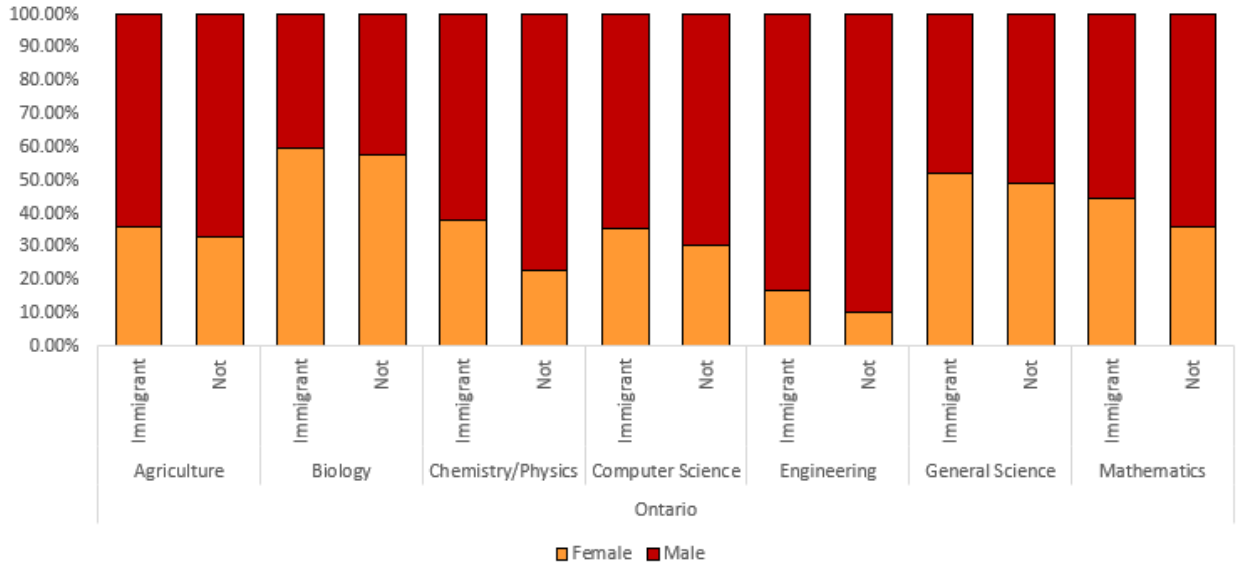
Chart 2.26 - Percentage of major field of study, sex and immigration status, in British Columbia (minus the North) in 2011



Source: National Household Survey 2011

The distribution of gender for immigrants and non-immigrants in Ontario was very similar to the distributions for all of Canada (Chart 2.27). The distributions were almost identical for agriculture, biology and general science. Immigrant females represented 59.8% of immigrants who reported their field of major study as biology, while non-immigrant females represented 57.7%. The largest differences were seen in chemistry/physics and mathematics. Immigrant females represented 44.5% in mathematics, while non-immigrant females represented 36.1%.

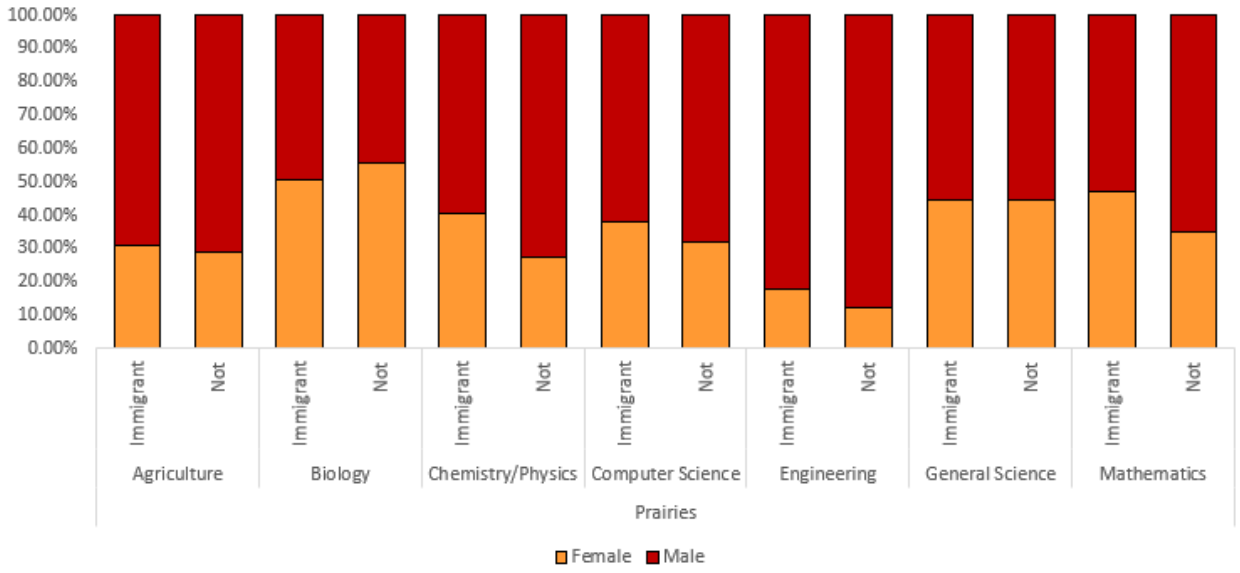
Chart 2.27 - Percentage of major field of study, sex and immigration status, in Ontario (minus the North) in 2011



Source: National Household Survey 2011

The distribution of gender for immigrants and non-immigrants in the Prairies was similar to the distribution for the rest of Canada (Chart 2.28). The distributions were approximately the same for immigrants and non-immigrants in general science and agriculture. There was a difference in the distribution of biology in comparison to the rest of Canada. Immigrant females represented 50.8% of immigrants who identified biology as their major field of study, while non-immigrant females represented 55.71%. The largest differences were seen in mathematics and chemistry/physics. Immigrant females in chemistry/physics represented 40.5% of immigrants who identified chemistry/physics as their major field of study, while non-immigrant females represented 27.5%.

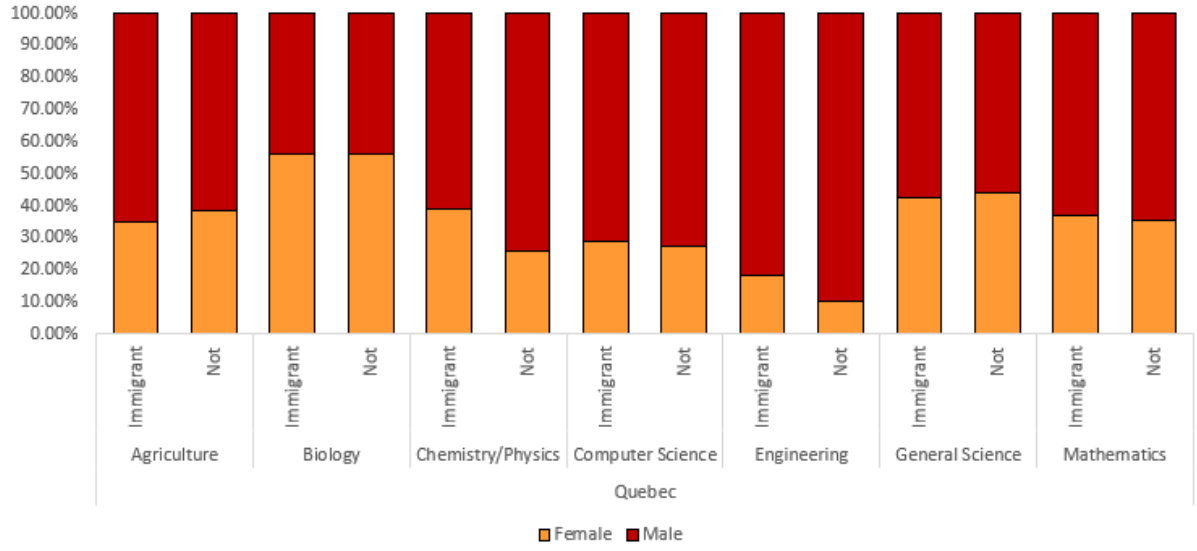
Chart 2.28 - Percentage of major field of study, sex and immigration status, in the Prairies (minus the North) in 2011



Source: National Household Survey 2011

In Quebec, the distribution of gender for immigrants and non-immigrants differed slightly in comparison to the distribution for all of Canada (Chart 2.29). The distributions were very similar for mathematics and general science. Immigrant females represented 37.0% of immigrants in mathematics, while non-immigrant females represented 35.7%. The largest difference was seen in chemistry/physics. Immigrant females in chemistry/physics represented 39.2% of all immigrants in biology, while non-immigrant females represented 26.0%.

Chart 2.29 - Percentage of major field of study, sex and immigration status, in Quebec (minus the North) in 2011



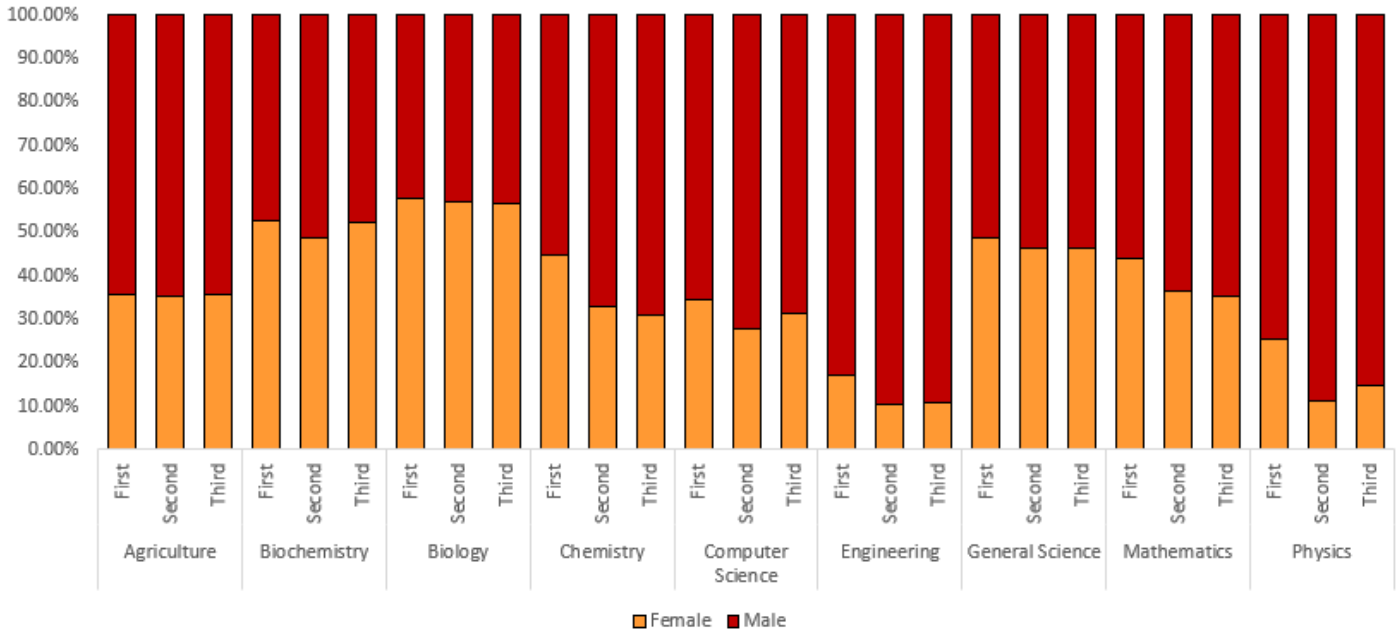
Source: National Household Survey 2011

2.8 MAJOR FIELD OF STUDY BY SEX AND GENERATION STATUS

Generation status refers to whether or not the person or the person's parents were born in Canada. It identifies persons as being first generation, second generation or third generation or more. First generation refers to people who were born outside Canada. Second generation includes individuals who were born in Canada and had at least one parent born outside Canada. Third generation or more refers to people who are born in Canada with both parents born in Canada. They may have several generations of ancestors born in Canada, or their grandparents may have been born abroad[5]. This variable was explored across all Canadians who identified their major field of study as one of the STEM fields of interest; agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics

The distribution of gender across generation status was relatively the same in agriculture, biochemistry, biology, and general science (Chart 2.30). For example, in agriculture, the distribution of females was approximately 35% for all three generations. Similarly, in biology, the distribution of females was approximately 57% for all three generations. In chemistry, computer science, engineering, mathematics and physics, the distribution of first generation females was slightly higher than for second and third generations. In engineering, the distribution of first generation females was 17.3%, while the distribution for second generation females was 10.4%, and 10.9% for third generation. The largest difference was seen in physics, where first generation females represented 25.6%, and second generation females represented 11.3%, with third generation was 14.7%.

Chart 2.30 - Percentage of major field of study, sex and generation status, in Canada in 2011



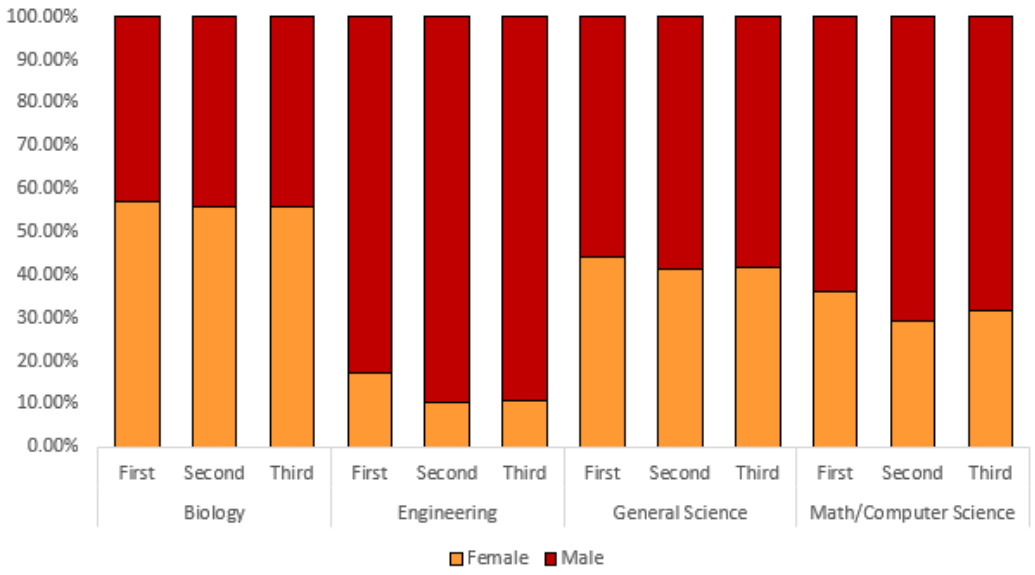
Source: National Household Survey 2011

2.9 MAJOR FIELD OF STUDY BY SEX, GENERATION STATUS ACROSS SIX REGIONS

For valid analysis across the regions, it was necessary to combine biochemistry, chemistry and physics into general science, and to combine math and computer science together. As well, agriculture was excluded, since the number of observations in each cell was too low to produce reliable estimates.

For these new categories, the distribution of gender across the three generations was very similar in biology, and general science (Chart 2.31). There was a slight difference in math/computer science, where first generation females represented 36.0%, while the second generation females were at 29.1% and 31.8%, respectively. The largest difference was seen in engineering, where first generation females represented 17.3%, and the other two generations were at approximately 10%.

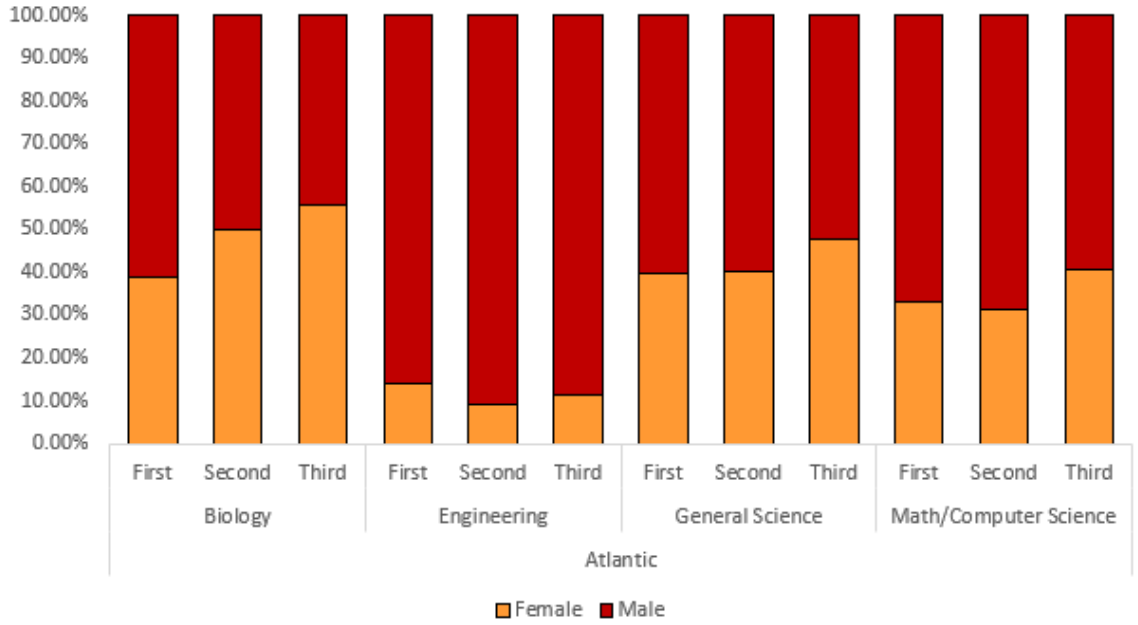
Chart 2.31 - Percentage of major field of study, sex and generation status, in Canada in 2011



Source: National Household Survey 2011

In the Atlantic provinces, the distribution of generation status differed slightly than for all of Canada (Chart 2.32). There were fewer first generation females in biology, at 38.8%, which increased to 55.7% for the third generation. A similar trend was seen in both general science and math/computer science. First generation females represented 39.6% of first generation respondents, while third generation females represented 47.6%.

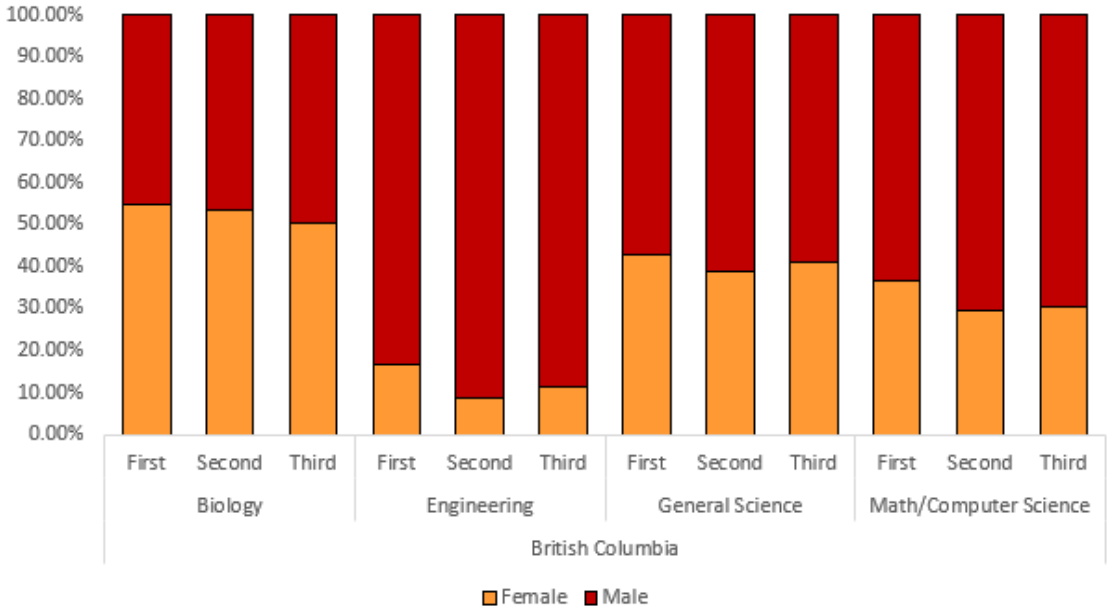
Chart 2.32 - Percentage of major field of study, sex and generation status, in the Atlantic provinces in 2011



Source: National Household Survey 2011

In British Columbia, the distribution of gender was relatively the same across the generation statuses in biology and general science (Chart 2.33). First generation females represented 54.9% of those who reported their major field of study as biology, while third generation females were 53.5%. The largest difference was seen in engineering, where first generation females were 16.5%, with second generation at 8.9%, and third at 11.1%.

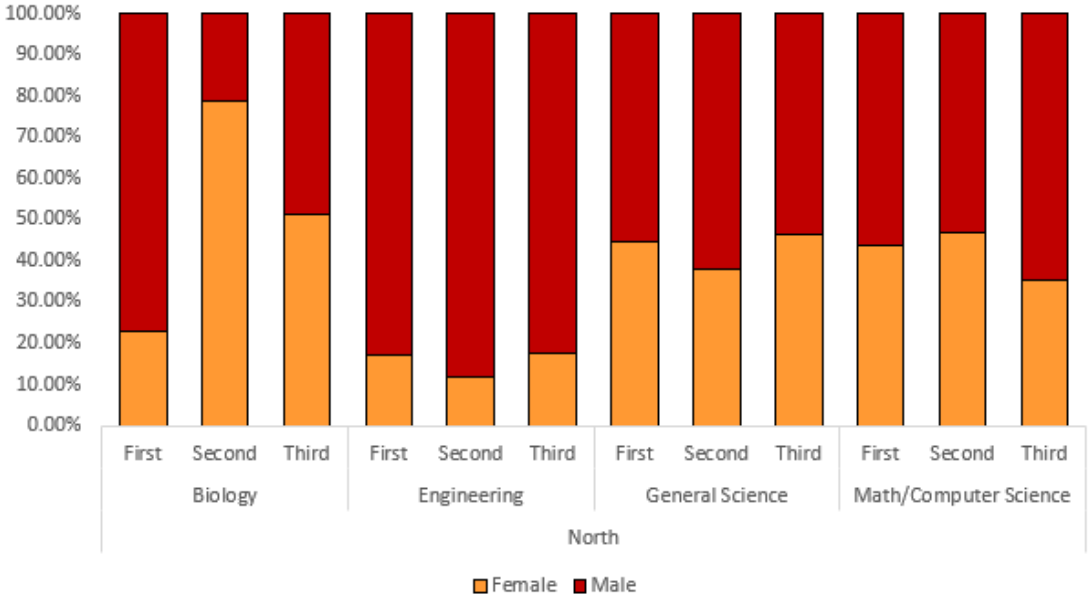
Chart 2.33 - Percentage of major field of study, sex and generation status, in British Columbia in 2011



Source: National Household Survey 2011

The distribution of gender across generation status was more varied in the North than in the rest of Canada (Chart 2.34). For example, first generation females represented 44.4% of those who identified general science as their major field of study, while second generation females represented 38.1%, and third generation females 46.5%. The largest difference was seen in biology, where first generation females represented 23.1%, second generation represented 78.6% and third generation represented 51.2%.

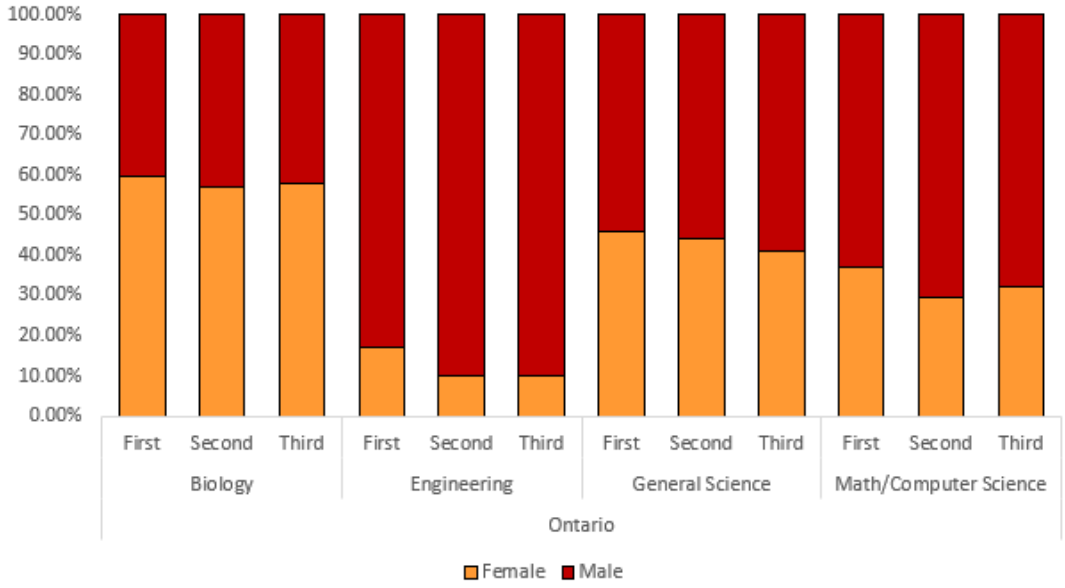
Chart 2.34 - Percentage of major field of study, sex and generation status, in the North in 2011



Source: National Household Survey 2011

In Ontario, the distribution of gender was relatively the same across generation status in biology and general science (Chart 2.35). First generation females represented 59.9% of all those who identified as first generation, while third generation females were 58.0%. The largest differences were seen in engineering and math/computer science. First generation females in math/computer science represented 37.1%, with second generation at 29.6%, and third at 32.4%.

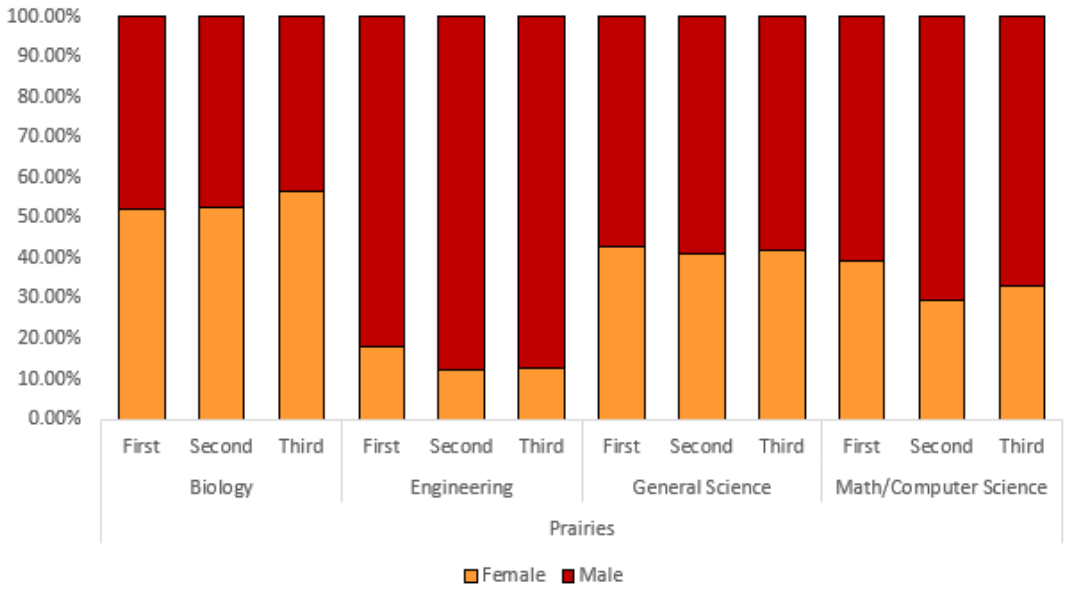
Chart 2.35- Percentage of major field of study, sex and generation status, in Ontario in 2011



Source: National Household Survey 2011

In the Prairies, the distribution of gender across generation status was relatively stable across the three generations (Chart 2.36). For example, in general science, first generation females represented 42.7% of those who identified general science as their major field of study, with second generation females were 41.3%, and third generation females were 42.1%. The largest difference was seen in math/computer science, where first generation females represented 39.5% of all those who identified as first generation, second generation was at 29.5%, and third at 33.3%.

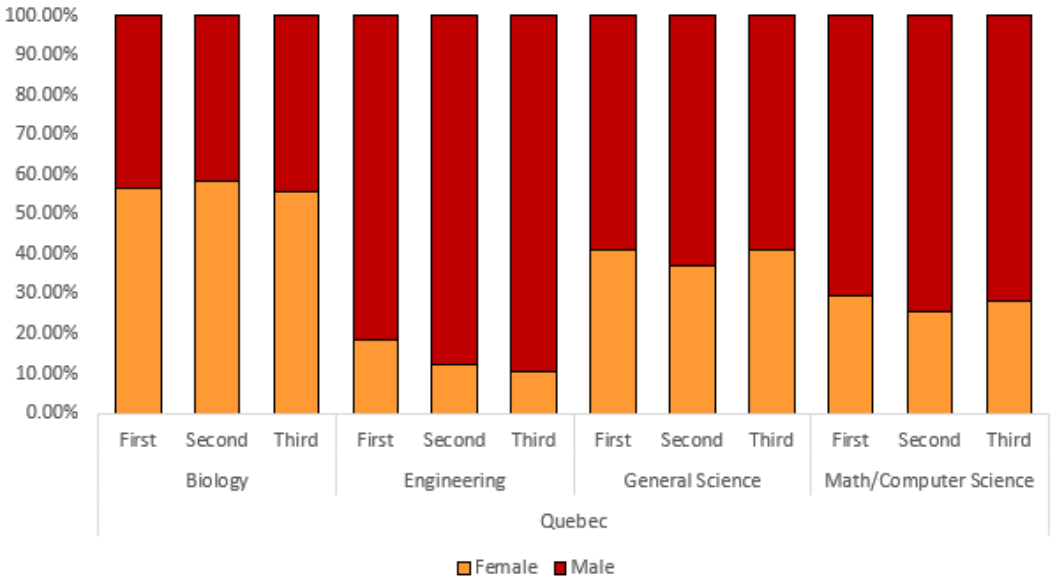
Chart 2.36 - Percentage of major field of study, sex and generation status, in the Prairies in 2011



Source: National Household Survey 2011

In Quebec, the distribution of gender across generation status was relatively constant in biology, general science and math/computer science (Chart 2.37). In general science, first generation females represented 40.9% of those who identified as first generation, second generation females were at 37.0% and third at 41.0%. In engineering, the distribution of first generation females was 18.4%, 12.2% for second generation and 10.3% for third generation.

Chart 2.37 - Percentage of major field of study, sex and generation status, in Quebec in 2011



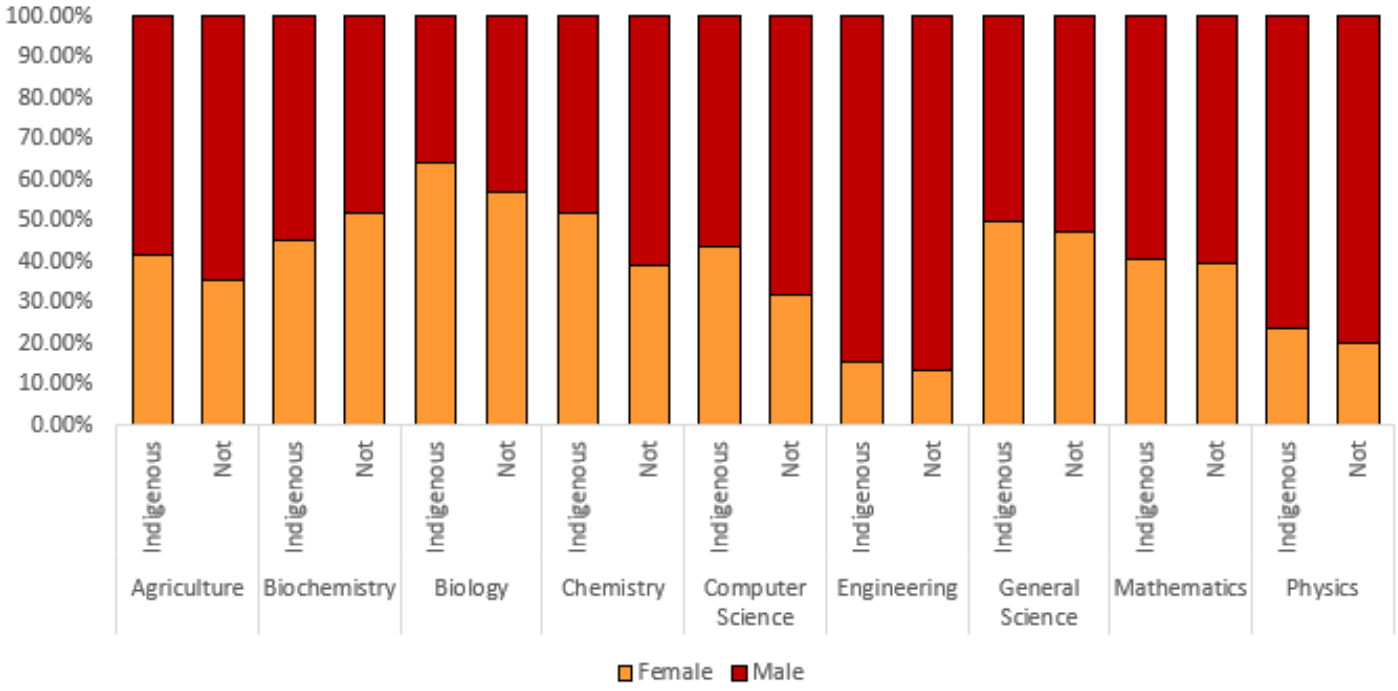
Source: National Household Survey 2011

2.10 MAJOR FIELD OF STUDY BY SEX AND INDIGENOUS STATUS

Indigenous status refers to whether the person reported being an Aboriginal person, that is, First Nations, Métis or Inuk and/or being a Registered or Treaty Indian (that is, registered under the Indian Act of Canada) and/or being a member of a First Nation or Indian band[6]. This variable was explored across all Canadians who identified their major field of study as one of the STEM fields of interest; agriculture, biochemistry, biology, chemistry, computer science, engineering, general science, mathematics and physics.

There were a few similarities across the distribution of gender for Indigenous and non-Indigenous peoples (Chart 2.38). The distribution of gender across major field of study was approximately equal for general science and biochemistry, for both Indigenous and non-Indigenous people. As well, females represented approximately 40% of those who identified their field of study as mathematics for both groups. For those who identified physics as their major field of study, females represented approximately 20% of the distribution, for both Indigenous and non-Indigenous people. The largest difference in gender distribution was seen in engineering, where females represented about 15% of the distribution of major field of study, for both groups.

Chart 2.38 - Percentage of major field of study, sex and Indigenous status, in Canada in 2011



Source: National Household Survey 2011

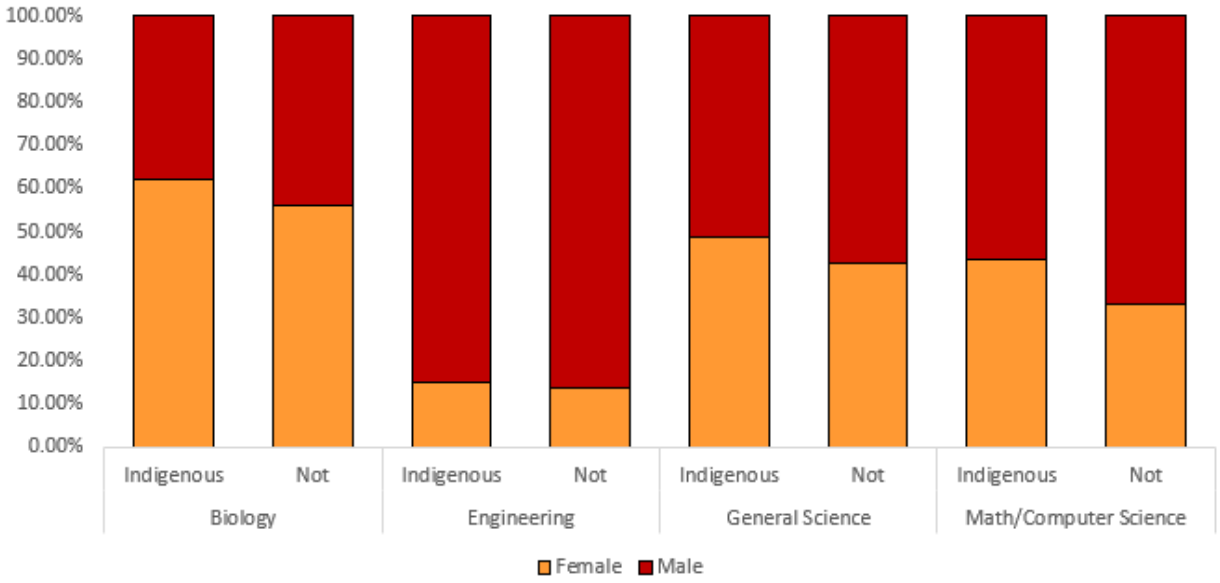
The distribution of both groups across gender did differ slightly in two fields. There were more Indigenous females who identified computer science as their major field of study, at 43.6% than for non-Indigenous females, at 31.9%. As well, the distribution of gender in chemistry was 51.7% for Indigenous females, but only 39% for females who identified as non-Indigenous.

2.11 MAJOR FIELD OF STUDY BY SEX, INDIGENOUS STATUS AND SIX REGIONS

For valid analysis across the regions, it was necessary to combine biochemistry, chemistry and physics into general science, and to combine math and computer science. As well, agriculture was dropped, since the number of observations in each cell was too low to produce reliable estimates.

The distribution of Indigenous and non-Indigenous people across gender was approximately equal for engineering (Chart 2.39). About 15% of those whose field of study was math/computer science were Indigenous females, while 13% were non-Indigenous females. The largest difference was seen in math/computer science, where the distribution of females was approximately 10% higher for Indigenous females, at 43.4%, while non-Indigenous females represented 33.0%.

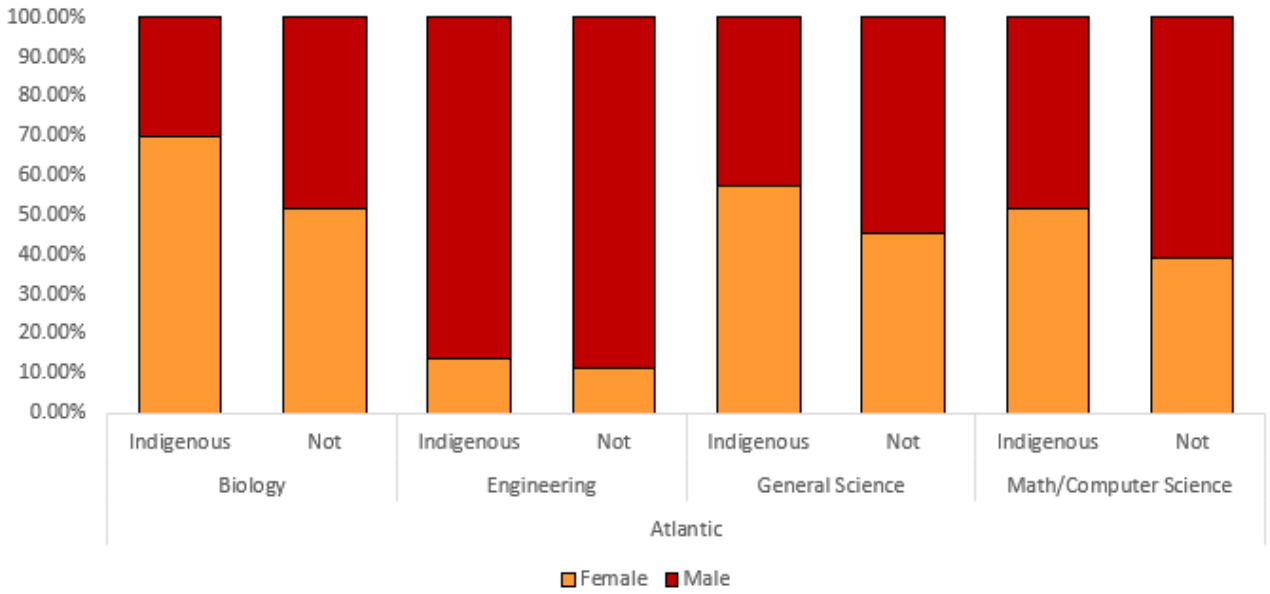
Chart 2.39 - Percentage of major field of study, sex and Indigenous status, in Canada in 2011



Source: National Household Survey 2011

For the Atlantic provinces, the distribution of Indigenous females in all programs was slightly higher than the distribution of non-Indigenous females (Chart 2.40). The distributions were similar in engineering, with Indigenous females representing 13.6% of Indigenous people whose major field of study was engineering, while non-Indigenous females represented 11.27%. The largest difference was seen in biology, where Indigenous females represented 70.0%, while non-Indigenous females represented 51.7%.

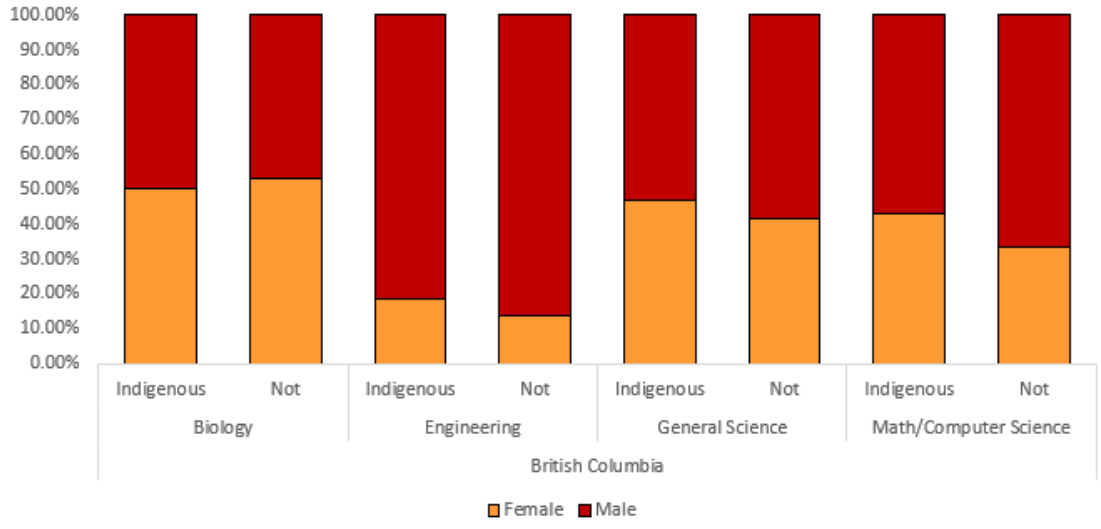
Chart 2.40 - Percentage of major field of study, sex and Indigenous status, in the Atlantic provinces in 2011



Source: National Household Survey 2011

In British Columbia, the distribution of gender for Indigenous and non-Indigenous people was very similar in biology and general sciences (Chart 2.41). Indigenous females represented 46.7% of Indigenous people who identified general science as their major field of study, while non-Indigenous females represent 41.5%. A larger difference was seen in math/computer science, where Indigenous females represented 42.9% of Indigenous people in math/computer science, while non-Indigenous females represented 33.4%.

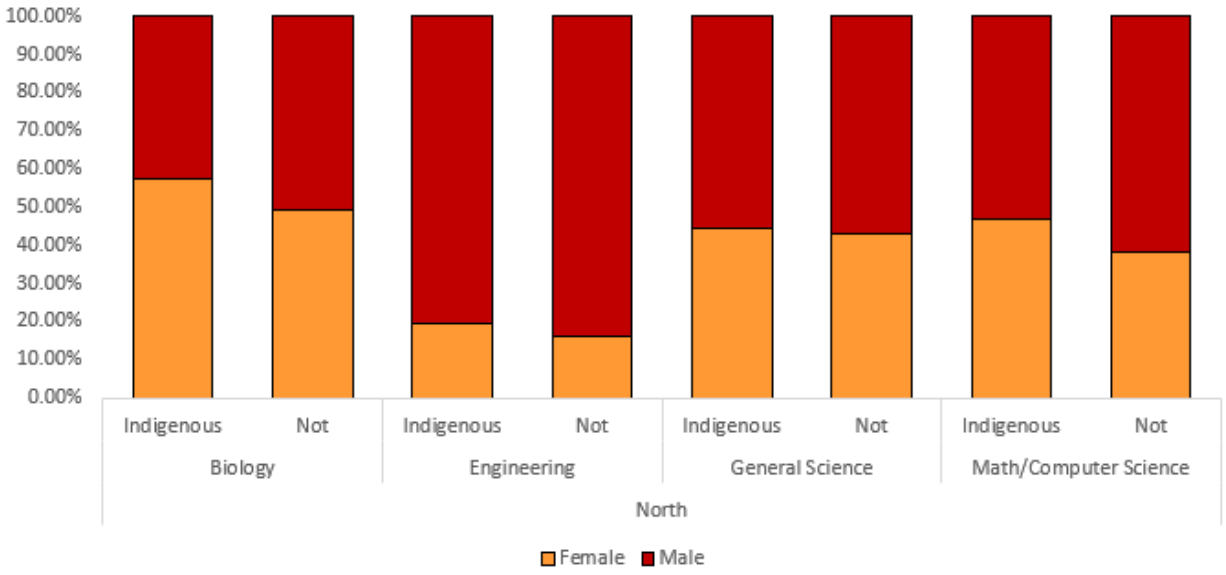
Chart 2.41 - Percentage of major field of study, sex and Indigenous status, in British Columbia in 2011



Source: National Household Survey 2011

In the North, the distribution of gender for Indigenous and non-Indigenous people was almost the same in general science (Chart 2.42). Indigenous females represented 44.4% of Indigenous people who identified their major field of study as general science, while non-Indigenous females represented 43.2%. The largest difference was seen in math/computer science, where Indigenous females represented 46.7% of math/computer science, while non-Indigenous females represented 38.0%.

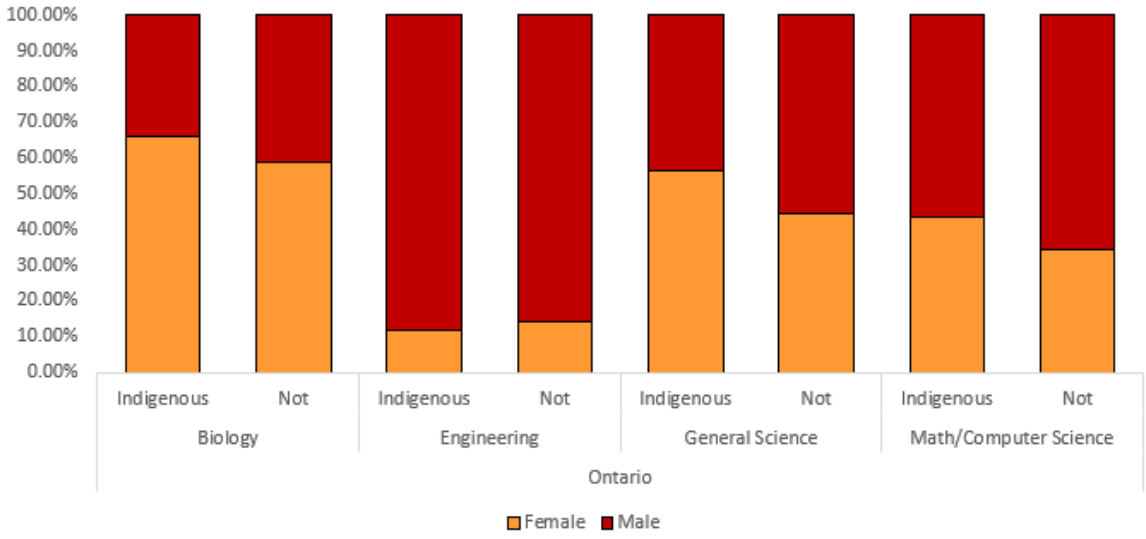
Chart 2.42 - Percentage of major field of study, sex and Indigenous status, in the North in 2011



Source: National Household Survey 2011

In Ontario, the distribution of gender in engineering was very similar for Indigenous and non-Indigenous people (Chart 2.43). Indigenous females represented 11.8% of Indigenous people who identified engineering as their major field of study, while non-Indigenous females represented 14.0%. The largest differences were seen in general science and math/computer science. Indigenous females represented 56.5% of Indigenous people who were in general science, while non-Indigenous females represented 44.2%.

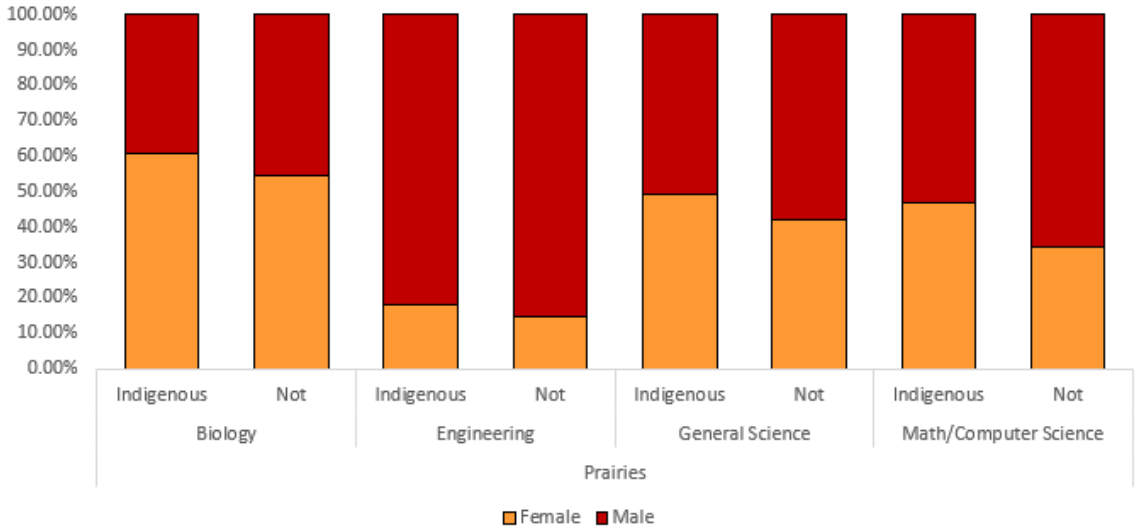
Chart 2.43 - Percentage of major field of study, sex and Indigenous status, in Ontario in 2011



Source: National Household Survey 2011

The distribution of gender for Indigenous and non-Indigenous people in the Prairies was very similar to the distribution for all of Canada (Chart 2.44). The smallest differences were seen in engineering, where Indigenous females represented 17.9% and non-Indigenous females 14.4%. The largest differences were seen in general science and math/computer science. Indigenous females represented 46.9% of Indigenous people who reported their major field of study as math/computer science, while non-Indigenous females represented 34.4%.

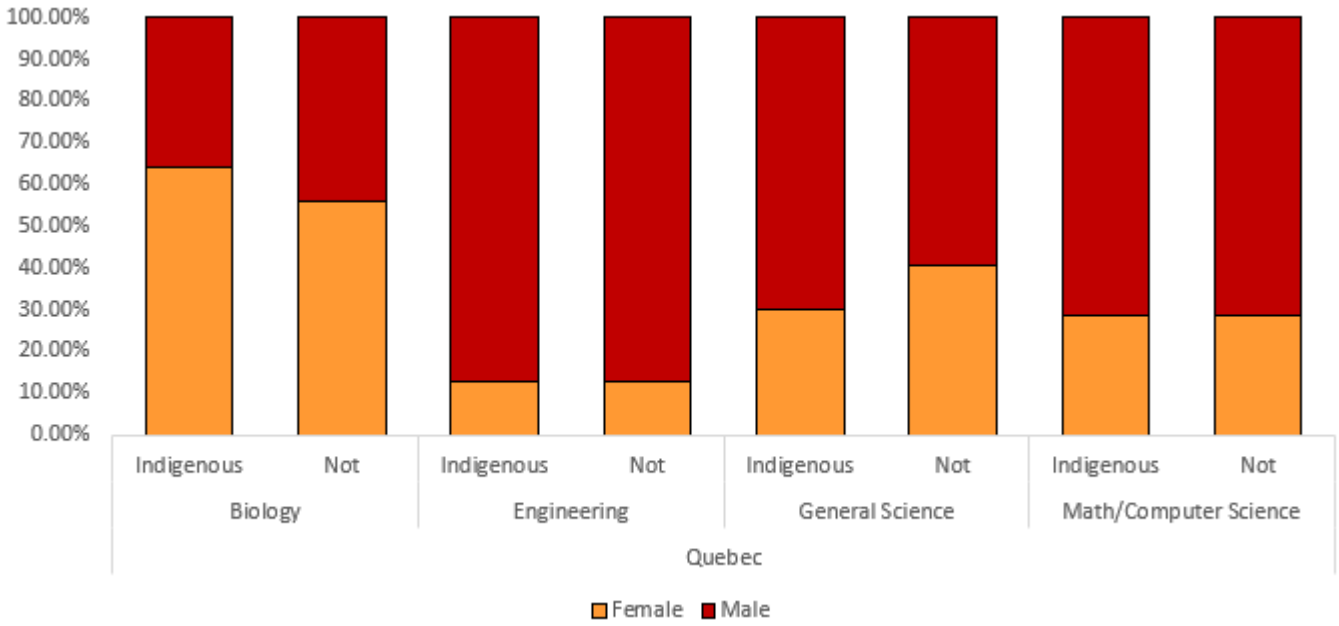
Chart 2.44 - Percentage of major field of study, sex and Indigenous status, in the Prairies in 2011



Source: National Household Survey 2011

In Quebec, the distribution of gender was very similar for Indigenous people and non-Indigenous people in engineering and math/computer science (Chart 2.45). In math/computer science, Indigenous females represented 28.6%, and non-Indigenous females represented 28.3%. This difference was much smaller than the difference reported for all of Canada. The largest difference was seen in general science, where Indigenous females represented 30.0% of Indigenous people who reported general science as their field of major study, while non-Indigenous females represented 40.7%.

Chart 2.45 - Percentage of major field of study, sex and Indigenous status, in Quebec in 2011



Source: National Household Su

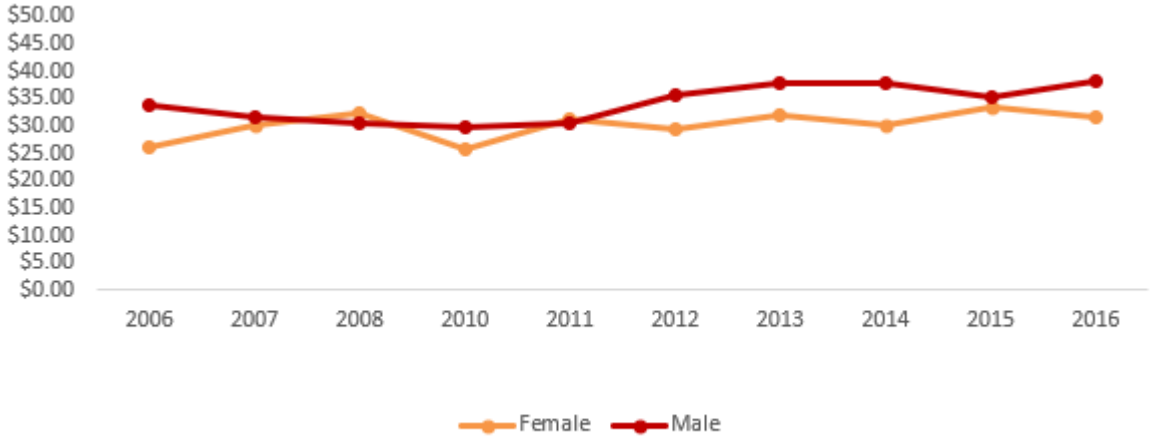
3. WAGES AND EMPLOYMENT IN STEM FIELDS

The population corresponds to all persons aged 15 years and over residing in the provinces of Canada other than Nunavut, Yukon and the Northwest Territories, with the exception of the following: persons living on Indian reserves, full-time members of the regular Armed Forces, and persons living in institutions[7] who reported working in STEM fields under the North American Industry Classification System (NAICS)[8] and who were currently employed. The average hourly wage in Canadian dollars (CAD) is reported across a span of nine years. Note that there is no information for 2009, as the size of the subset of interest did not allow for reliable interpretations. As well, due to the data constraints, the classification of STEM fields are listed as: Agriculture, Biology, Engineering, Math/Computer Sciences, and General Sciences. These STEM fields include all education levels (i.e. no education, high school equivalency, Masters, etc.).

3.1 WAGES BY SEX

Average salary in STEM fields does not appear to be independent of gender, as seen in Chart 3.1. In 2006, men earned almost ten dollars more an hour, at $33.70, while women earned $26.27 an hour. For the next few years, the average wage appeared to be relatively similar for both genders. For example, in 2007, women earned $30.19 an hour, and men earned $31.48, and in 2011, women earned $31.43 an hour, and men earned $30.65. However, in 2012, a larger difference in wages is seen again, with men earning $35.58 an hour and women $29.57 an hour. In 2016, women earned even less, at $31.58 an hour, and men at $38.11 an hour.

Chart 3.1 - Average hourly wage in STEM fields in Canada by sex, from 2006-2016

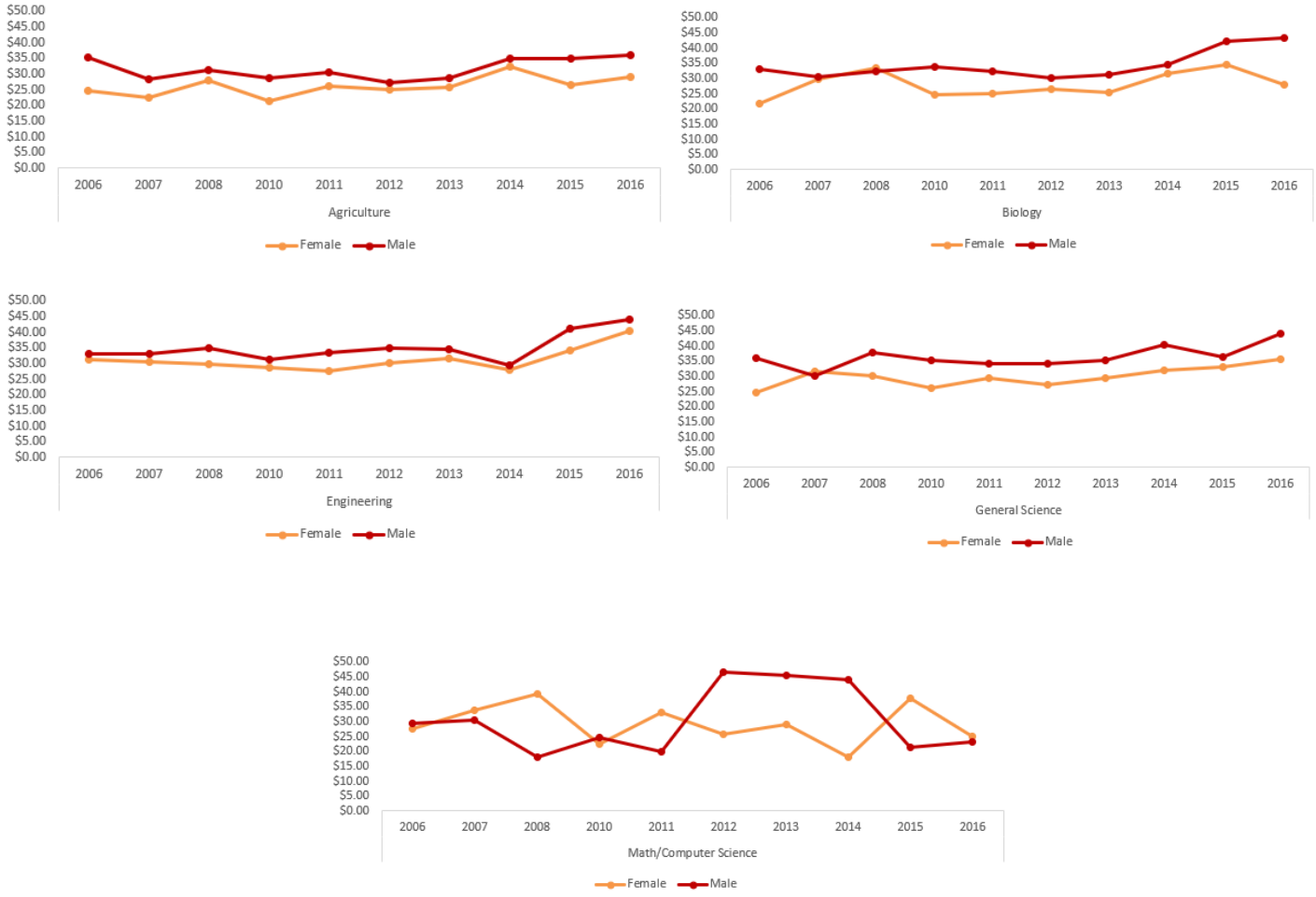


Source: Labour Force Survey 2006-2016

3.2 WAGES BY SEX AND PROGRAM

For engineering, agriculture, general science and biology, males earned overall a higher average hourly wage than females (Chart 3.2). For example, in agricultural fields in 2006, men earned $35.17 an hour, and women earned $24.61. Ten years later, in 2016, women earned $29.03 an hour, and men earned $36.04. As well, in biology in 2006, women earned $21.68 an hour and men earned $32.95. In 2016 the difference was much larger, with women earning $27.84 an hour, and men earning $43.24 an hour.

Chart 3.2 - Average hourly wage in Agriculture, Biology, Engineering, Math/Computer Sciences, General Sciences and Veterinary/Dentist/Doctor fields in Canada by sex, from 2006-2016.



Source: Labour Force Survey 2006-2016

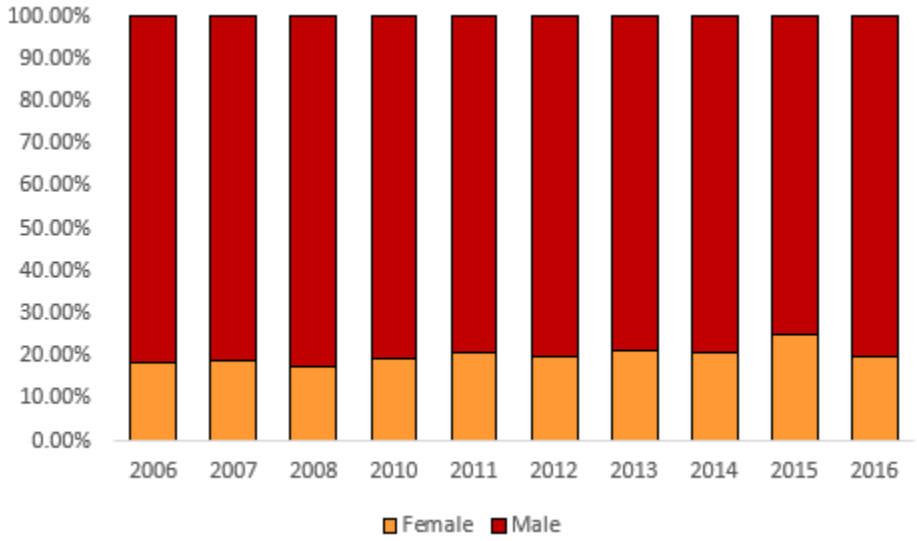
In math and computer sciences, women initially earned more an hour than men (Chart 3.2). In 2008, women earned $39.44 an hour, and men earned $18.22. However, there was a reversal of this trend in 2012, with men earning $46.54 an hour, and women earning $25.78. In 2016, women earned $24.98 an hour, and men $23.08. It is important to recall that these values for math/computer science are calculated for all education levels, and the large fluctuations in hourly salary may be heavily influence by the rapidly-changing field of technology. A more focused study accounting for education level may provide further information.

3.3 EMPLOYMENT BY SEX AND PROGRAM

The distribution of gender across years, for persons aged 15 years and over residing in the provinces of Canada (with the exceptions listed in the beginning of the section) who reported working in STEM fields under the North American Industry Classification System (NAICS)[5] and were also employed. Again, due to the data constraints, the classification of STEM fields are listed as: Agriculture, Biology, Engineering, Math/Computer Sciences, and General Sciences. These fields include all education levels (i.e. no education, high school equivalency, Masters, etc.).

The distribution of gender for those who were employed was not equal across STEM fields (Chart 3.3). In 2006, women represented 18.32% of those employed in STEM fields. This proportion reached a high of 25.05% in 2015, however dropped to 20.06% in 2016.

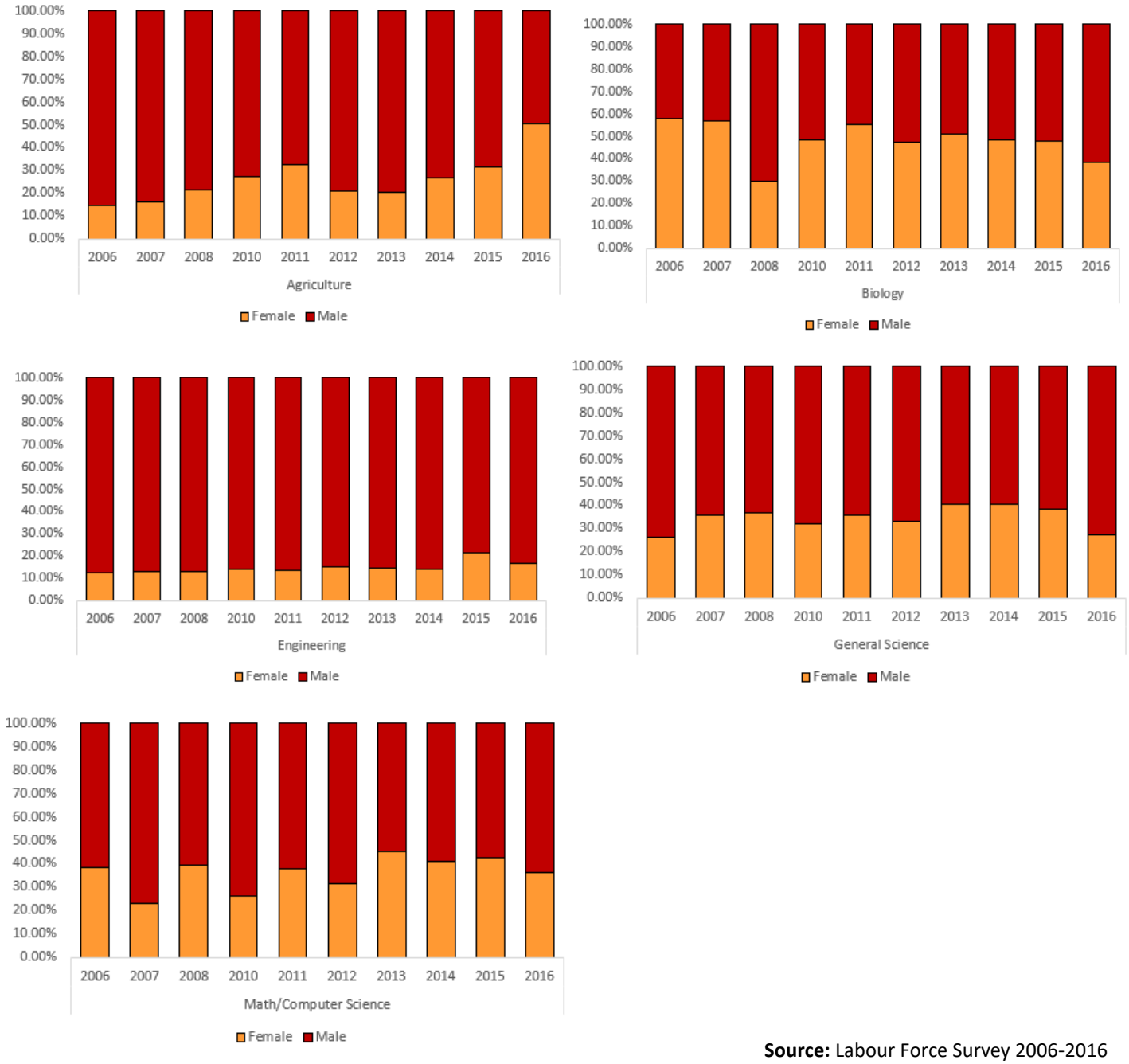
Chart 3.3 - Distribution of gender for employment STEM fields in Canada, from 2006-2016



Source: Labour Force Survey 2006-2016

The proportion of females who were employed in agricultural fields in Canada was 14.42% in 2006 (Chart 3.4). By 2016 the distribution of gender across employment was almost equal, at 50.46% for females, and 49.54% for males. %. For those employed in biology, the proportion who were female was approximately the same as males, at 57.65%. In 2016, the proportion was quite a bit lower for females, at 38.57%.

Chart 3.4 - Distribution of gender for employment in Agriculture, Biology, Engineering, Math/Computer Sciences, General Sciences and Veterinary/Dentist/Doctor in Canada, from 2006-2016



Source: Labour Force Survey 2006-2016

The proportion of females who were employed in general sciences in 2006 was 26.09% (Chart 3.4). This reached a high of 40.33% in 2013, but returned to a lower proportion in 2016, at 27.45%. In math/computer science in 2006, the proportion who were employed and were female was 38.52%. This reached a high of 44.99% in 2013, and returned to a lower proportion in 2016 at 36.37%. The field that has the lowest distribution of employed females is engineering. In 2006, the proportion of females who were employed in engineering was 12.47%. This proportion was slightly higher in 2016, with 17.07% of those employed in engineering female.

4. APPENDIX

4.1 TABLES OF COUNTS FOR UNDERGRADUATE AND GRADUATE DEGREES AWARDED BY SEX

Table 1.1
Count of sex across post-secondary degree obtained and STEM fields in Canada, for 2000-2009

Program	2000	2005	2009
Agriculture			
Female	1422	1887	1732
Male	1999	1698	1689
Biology			
Female	6675	7412	8206
Male	3995	3767	4803
Chemistry			
Female	849	707	730
Male	894	692	1002
Computer Science			
Female	4522	2961	1491
Male	8129	10253	6751
Engineering			
Female	4558	5430	5532
Male	18026	22603	26535
General Science			
Female	948	965	2596
Male	887	764	2700
Mathematics			
Female	793	893	675
Male	1046	1220	1261
Physics			
Female	302	202	121
Male	701	817	904

Data used for chart 1.1. **Source:** National Graduates Survey 2000-2009

Table 1.2
Count of sex across type of post-secondary degree obtained and STEM fields in Canada, for 2000-2009

	Bachelor			Doctorate			Masters		
Program	**2000**	**2005**	**2009**	**2000**	**2005**	**2009**	**2000**	**2005**	**2009**
Agriculture									
Female	536	502	465	34	30	47	140	132	245
Male	624	351	276	47	31	33	174	126	153
Biology									
Female	5242	5755	6290	242	268	511	593	984	1039
Male	3036	2805	3343	347	339	436	450	472	830
Chemistry/Physics									
Female	708	664	487	66	59	115	173	122	191
Male	1036	967	1308	251	179	307	229	258	264
Computer Science									
Female	1294	1055	476	27	25	63	369	367	408
Male	2656	4638	2533	51	76	169	491	859	838
Engineering									
Female	2236	2731	2533	75	83	202	444	725	907
Male	6792	8857	11088	470	399	749	1358	2745	2830
General Science									
Female	483	613	1711	18	17	42	61	119	422
Male	428	369	1466	54	41	169	141	134	638
Mathematics									
Female	692	693	381	14	27	43	82	160	235
Male	754	907	737	86	52	135	196	207	274

Data used for charts 1.2-1.9 **Source:** National Graduates Survey 2000-2009

Table 1.3
Count of sex across visible minority status, and degree obtained in STEM fields in Canada, for 2000-2009

	2000		2005		2009	
Row Labels	**Not**	**Visible Minority**	**Not**	**Visible Minority**	**Not**	**Visible Minority**
Agriculture						
Female	1335	81	1749	123	1489	218
Male	1823	117	1590	94	1467	163
Biology						
Female	4903	1413	5305	2063	5799	2280
Male	2953	915	2511	1138	3506	1250
Chemistry						
Female	608	231	511	184	324	393
Male	685	185	485	199	661	324
Computer Science						
Female	3198	1167	1761	1173	844	561
Male	5420	2146	6610	3559	4330	2196
Engineering						
Female	3351	1008	3350	1979	3544	1610
Male	13196	4077	15224	7063	17191	7771
General Science						
Female	885	57	761	197	1382	1172
Male	838	29	618	145	1528	1066
Mathematics						
Female	472	286	517	336	363	245
Male	708	275	687	527	646	506
Physics						
Female	207	64	169	33	84	35
Male	588	94	647	167	694	186

Data used for charts 1.10-1.18 **Source:** National Graduates Survey 2000-2009

Table 1.4
Count of sex across Indigenous status, and degree obtained in STEM fields in Canada, for 2000-2009

	2000		2005		2009	
Row Labels	**Indigenous**	**Not**	**Indigenous**	**Not**	**Indigenous**	**Not**
Biology						
Female	110	6543	85	7288	246	7662
Male	25	3971	34	3615	48	4665
Engineering						
Female	29	4526	81	5250	71	5225
Male	315	17634	463	21936	704	23979
General Science						
Female	44	3472	80	3650	116	4904
Male	45	4377	46	3899	73	5950
Math/Computer Science						
Female	130	5156	114	3691	90	1908
Male	199	8943	148	11273	252	7300

Data used for charts 1.19-1.23 **Source:** National Graduates Survey 2000-2009

3.2 TABLES OF COUNTS FOR MAJOR FIELD OF STUDY

Table 2.1
Count of major field of study and sex in Canada in 2011

Program	Female	Male
Agriculture	72360	130900
Biochemistry	14150	13200
Biology	95500	72000
Chemistry	26020	40420
Computer Science	158710	335970
Engineering	183170	1163100
General Science	113300	127400
Mathematics	32030	48500
Physics	7230	28310

Data used for chart 2.1 **Source:** NHS2011

Table 2.2

Count of major field of study and sex in Canadian regions in 2011

Program	Atlantic	BC	North	Ontario	Prairies	Quebec
Agriculture						
Female	4110	10870	90	23410	14640	19230
Male	5640	13880	110	44920	35020	31320
Biology						
Female	5430	15600	340	48970	15290	24010
Male	5000	13840	340	34540	12760	18730
Chemistry/Physics						
Female	1370	4910	30	15970	4300	6670
Male	3060	10480	80	32660	8270	14170
Computer Science						
Female	12500	18830	280	68850	22470	35780
Male	18740	39520	460	139850	43210	94180
Engineering						
Female	8040	23300	410	79330	34180	37900
Male	62890	147430	2020	489690	201110	259960
General Science						
Female	6820	15450	390	45770	19510	25350
Male	6620	18160	460	45120	24370	32660
Mathematics						
Female	980	4050	60	18450	3530	4960
Male	1930	5640	60	26930	5120	8820

Data used for charts 2.2-2.8 **Source:** National Household Survey 2011

Table 2.3
Count of major field of study and sex, by visible minority in Canada in 2011

Program	Not	Visible Minority
Agriculture		
Female	62220	10140
Male	115100	15800
Biochemistry		
Female	9090	5060
Male	8640	4560
Biology		
Female	67330	28170
Male	52410	19590
Chemistry		
Female	13960	12070
Male	26130	14290
Computer Science		
Female	103950	54770
Male	228350	107620
Engineering		
Female	113610	69560
Male	834600	328500
General Science		
Female	79600	33690
Male	94550	32850
Mathematics		
Female	19390	12640
Male	32570	15930
Physics		
Female	4040	3190
Male	20360	7950

Data for chart 2.9. Source: National Household Survey 2011

Table 2.4
Count of major field of study and sex, by visible minority in Canadian regions in 2011

	Female		Male	
Row Labels	**Not**	**Visible Minority**	**Not**	**Visible Minority**
Agriculture				
Atlantic	4030	80	5460	180
BC	8570	2300	11050	2830
Ontario	18820	4590	37750	7170
Prairies	12850	1800	31790	3240
Quebec	17880	1360	28960	2360
Biology				
Atlantic	5030	400	4370	630
BC	10340	5260	9690	4150
Ontario	30190	18780	22040	12500
Prairies	11390	3900	9380	3370
Quebec	19140	4880	15240	3490
Chemistry/Physics				
Atlantic	1220	150	2720	340
BC	2090	2820	6510	3970
Ontario	7630	8340	20560	12100
Prairies	2380	1930	5680	2600
Quebec	4650	2020	10940	3230
Computer Science				
Atlantic	11870	640	17520	1210
BC	9990	8840	22390	17130
Ontario	37910	30940	80320	59530
Prairies	14980	7500	30810	12400
Quebec	28970	6810	76900	17280
Engineering				
Atlantic	7280	760	59160	3730
BC	11960	11330	93700	53730
Ontario	43810	35530	315960	173730
Prairies	21550	12630	144990	56130
Quebec	28660	9250	219040	40910
General Science				

Atlantic	6510	320	6330	290
BC	9420	6030	11640	6520
Ontario	26900	18870	28990	16130
Prairies	14110	5400	19070	5300
Quebec	22290	3060	28070	4590
Mathematics				
Atlantic	820	160	1740	200
BC	1970	2090	3270	2360
Ontario	10770	7680	17440	9490
Prairies	2080	1450	3450	1670
Quebec	3710	1260	6610	2210

Data used for charts 2.10-2.15 **Source:** National Household Survey 2011

Table 2.5

Count of major field of study and sex, by immigration status in Canada in 2011

Row Labels	Immigrant	Not
Agriculture		
Female	16860	54230
Male	31260	98390
Biochemistry		
Female	5900	7900
Male	5280	7520
Biology		
Female	31700	60700
Male	23340	46560
Chemistry		
Female	16460	8640
Male	20510	18850
Computer Science		
Female	62810	91540
Male	118570	208490
Engineering		
Female	94440	82520
Male	456570	682450
General Science		
Female	36260	74940
Male	38490	86780
Mathematics		
Female	16540	14380
Male	21230	25980
Physics		
Female	4520	2180
Male	13450	13680

Data used for chart 2.16 **Source:** NHS 2011

Table 2.6

Count of major field of study and sex, by immigration status in Canadian regions in 2011

	Immigrant		Not	
Row Labels	**Female**	**Male**	**Female**	**Male**
Biology				
Atlantic	630	930	4720	3880
British Columbia	5930	4920	9140	8550
North	30	100	320	230
Ontario	20480	13750	27310	20020
Prairies	3950	3820	10680	8490
Quebec	6590	5100	16430	12910
Engineering				
Atlantic	940	5790	6930	55940
British Columbia	14050	72500	8270	71720
North	90	370	320	1600
Ontario	50940	248930	26200	233050
Prairies	14300	65620	18310	128540
Quebec	14110	63360	22490	191600
General Science				
Atlantic	710	1150	7320	8280
British Columbia	9600	13020	10090	14970
North	70	100	350	440
Ontario	31830	37510	28570	38860
Prairies	7690	10130	15460	21500
Quebec	7340	10550	23980	35250
Math/Computer Science				
Atlantic	810	1710	12430	18640
British Columbia	12250	20750	9720	22520
North	60	90	260	430
Ontario	46260	78130	38800	85060
Prairies	9280	14290	15470	32200
Quebec	10690	24830	29250	75610

Data used for charts 2.17-2.23 **Source:** National Household Survey 2011

Table 2.7
Count of major field of study and sex, by immigration status in five Canadian regions in 2011

	Immigrant		Not	
Row Labels	**Female**	**Male**	**Female**	**Male**
Agriculture				
Atlantic	310	760	3790	4870
British Columbia	3230	5330	7410	8460
Ontario	8150	14480	14910	30110
Prairies	2850	6420	11310	28080
Quebec	2290	4240	16760	26800
Biology				
Atlantic	630	930	4720	3880
British Columbia	5930	4920	9140	8550
Ontario	20480	13750	27310	20020
Prairies	3950	3820	10680	8490
Quebec	6590	5100	16430	12910
Chemistry/Physics				
Atlantic	260	570	1060	2390
British Columbia	3420	5790	1270	4370
Ontario	11400	18680	3930	13100
Prairies	2440	3580	1620	4260
Quebec	3440	5320	2930	8340
Computer Science				
Atlantic	640	1370	11680	17120
British Columbia	9720	17760	8400	20110
Ontario	36130	65490	30940	71160
Prairies	7550	12360	13890	29240
Quebec	8740	21510	26400	70490
Engineering				
Atlantic	940	5790	6930	55940
British Columbia	14050	72500	8270	71720
Ontario	50940	248930	26200	233050
Prairies	14300	65620	18310	128540
Quebec	14110	63360	22490	191600
General Science				
Atlantic	450	590	6260	5890
British Columbia	6180	7230	8820	10600
Ontario	20430	18820	24640	25760
Prairies	5240	6550	13840	17240
Quebec	3890	5230	21050	26910
Mathematics				
Atlantic	180	340	750	1520

British Columbia	2520	2990	1310	2410
Ontario	10130	12640	7860	13910
Prairies	1730	1930	1590	2960
Quebec	1950	3320	2850	5130

Data used for charts 2.24-2.29 **Source:** National Household Survey 2011

Table 2.8
Count of major field of study and sex, by generation status in Canada in 2011

Program	Female	Male
Agriculture		
First	18230	32640
Second	8990	16580
Third	45140	81670
Biochemistry		
First	6330	5730
Second	2320	2450
Third	5500	5030
Biology		
First	35320	25810
Second	17770	13430
Third	42410	32760
Chemistry		
First	17480	21710
Second	2480	5100
Third	6070	13600
Computer Science		
First	67500	128500
Second	19120	49690
Third	72100	157770
Engineering		
First	101000	483550
Second	18230	156270
Third	63940	523280
General Science		
First	38750	41020
Second	19940	23250
Third	54610	63130
Mathematics		
First	17750	22720
Second	4490	7860
Third	9790	17920
Physics		
First	5080	14770
Second	500	3930
Third	1650	9600

Data for chart 2.30 **Source:** NHS 2011

Table 2.9
Count of major field of study and sex, by generation status in Canadian region, in 2011

	Female			Male		
Program	**First**	**Second**	**Third**	**First**	**Second**	**Third**
Biology						
Atlantic	730	510	4200	1150	510	3340
British Columbia	6600	3490	5520	5410	3030	5390
North	30	110	210	100	30	200
Ontario	21910	10680	16390	14660	8010	11870
Prairies	4680	2790	7820	4310	2500	5950
Quebec	7710	2520	13780	5890	1790	11040
Engineering						
Atlantic	1150	390	6510	7140	3960	51790
British Columbia	15080	2450	5770	76240	25210	45980
North	90	40	280	430	300	1300
Ontario	53280	8690	17370	257760	79090	152850
Prairies	15930	4370	13890	73200	31160	96750
Quebec	15480	2300	20120	68790	16550	174610
General Science						
Atlantic	950	690	6550	1450	1020	7210
British Columbia	10350	3860	6160	13750	6090	8800
North	80	80	270	100	130	310
Ontario	33390	11230	17120	39200	14160	24420
Prairies	8410	4140	11260	11270	5890	15480
Quebec	8140	2920	20970	11740	4980	30120
Math/Computer Science						
Atlantic	1060	710	11710	2130	1550	16990
British Columbia	13230	3330	6320	22800	7900	14460
North	70	70	190	90	80	350
Ontario	48660	13380	25250	82310	31760	52710
Prairies	10630	3180	12200	16280	7600	24450
Quebec	11590	2940	26210	27610	8660	66740

Data used for charts 2.31-2.37. **Source:** National Household Survey 2011

Table 2.10

Count of major field of study and sex, by Indigenous status in Canada in 2011

Row Labels	Indigenous	Not
Agriculture		
Female	1540	70820
Male	2180	128720
Biochemistry		
Female	100	14050
Male	120	13090
Biology		
Female	1120	94370
Male	620	71370
Chemistry		
Female	150	25870
Male	140	40280
Computer Science		
Female	4190	154520
Male	5430	330540
Engineering		
Female	3120	180050
Male	17390	1145710
General Science		
Female	1620	111680
Male	1640	125770
Mathematics		
Female	200	31830
Male	290	48220
Physics		
Female	40	7190
Male	130	28170

Data used for chart 2.38 **Source:** NHS 2011

Table 2.11
Count of major field of study and sex, by Indigenous status in Canadian regions in 2011

	Female		Male	
Program	**Indigenous**	**Not**	**Indigenous**	**Not**
Biology				
Atlantic	140	5290	60	4940
British Columbia	150	15450	150	13680
North	40	300	30	310
Ontario	430	48540	220	34320
Prairies	280	15010	180	12570
Quebec	180	23830	100	18620
Engineering				
Atlantic	260	7780	1650	61230
British Columbia	570	22730	2550	144880
North	120	290	500	1510
Ontario	670	78670	5010	484680
Prairies	1140	33040	5240	195880
Quebec	360	37540	2440	257520
General Science				
Atlantic	280	7920	210	9460
British Columbia	350	20010	400	28250
North	40	380	50	500
Ontario	480	61260	370	77420
Prairies	510	23300	530	32110
Quebec	150	31870	350	46480
Math/Computer Science				
Atlantic	570	12920	530	20140
British Columbia	630	22250	840	44320
North	70	270	80	440
Ontario	1180	86110	1540	165240
Prairies	1530	24480	1730	46600
Quebec	400	40340	1000	102010

Data used for charts 2.39-2.45 **Source:** National Household Survey 2011

4.3 TABLES OF COUNTS FOR EMPLOYMENT RATES AND WAGES IN STEM FIELDS

Table 3.1
Average hourly wage in STEM fields in Canada 2006-2016

Program	2006	2007	2008	2010	2011	2012	2013	2014	2015	2016
Agriculture										
Female	$24.61	$22.61	$28.11	$21.43	$26.23	$25.11	$25.70	$32.32	$26.67	$29.03
Male	$35.17	$28.34	$31.15	$28.65	$30.60	$27.30	$28.81	$35.10	$35.09	$36.04
Biology										
Female	$21.68	$29.89	$33.54	$24.54	$24.88	$26.39	$25.55	$31.67	$34.60	$27.84
Male	$32.95	$30.59	$32.35	$33.76	$32.27	$30.01	$31.14	$34.52	$42.30	$43.24
Engineering										
Female	$31.41	$30.42	$29.94	$28.55	$27.58	$30.20	$31.79	$27.92	$34.22	$40.47
Male	$33.13	$33.15	$35.03	$31.32	$33.54	$34.94	$34.63	$29.43	$41.08	$43.94
General Science										
Female	$24.72	$31.74	$30.27	$26.01	$29.61	$27.21	$29.50	$31.85	$33.14	$35.57
Male	$36.17	$30.13	$38.00	$35.45	$34.08	$34.27	$35.12	$40.45	$36.22	$44.27
Math/Computer Science										
Female	$27.61	$33.77	$39.44	$22.43	$33.22	$25.78	$28.98	$18.00	$37.78	$24.98
Male	$29.43	$30.46	$18.22	$24.55	$19.89	$46.54	$45.44	$43.96	$21.48	$23.08

Data used for charts 3.1-3.2

Source: Labour Force Survey 2006-2016

Table 3.2
Count of employed in STEM fields by gender in Canada 2006-2016

Sum of Count	Column Labels									
Row Labels	**2006**	**2007**	**2008**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Agriculture										
Female	860	1,567	1,968	7,414	8,887	5,997	6,059	6,198	2,596	4,288
Male	5,104	7,957	7,099	19,945	18,394	22,512	23,841	16,918	5,649	4,210
Biology										
Female	10,336	9,502	4,002	11,352	15,839	12,899	15,659	14,863	8,168	5,114
Male	7,593	7,250	9,436	12,029	12,721	14,264	15,109	15,782	8,897	8,144
Engineering										
Female	24,322	30,261	30,788	65,336	64,219	65,374	66,570	67,138	57,430	48,341
Male	170,785	197,386	205,337	399,120	408,135	371,536	390,208	410,794	208,695	235,788
General Science										
Female	7,804	7,171	9,019	35,600	38,228	32,034	44,303	39,297	11,321	9,274
Male	22,108	12,826	15,358	75,380	68,000	64,529	65,557	58,260	18,012	24,515
Math/Computer Science										
Female	2,482	2,019	2,351	1,423	2,068	1,183	2,053	1,506	2,051	2,472
Male	3,962	6,710	3,621	3,971	3,369	2,575	2,510	2,169	2,756	4,325

Data used for charts 3.3-3.4 **Source:** Labour Force Survey 2006-2016

4.4 ENDNOTES

[1] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&Id=6014#a2

[2] http://www23.statcan.gc.ca/imdb/pIX.pl?Function=getThemeSub&PItem_Id=97413&PCE_Id=396&PCE_Start=01010001&cc=1

[3] http://www23.statcan.gc.ca/imdb/pIX.pl?Function=getThemeSub&PItem_Id=97413&PCE_Id=283&PCE_Start=01010001&cc=1

[4] http://www23.statcan.gc.ca/imdb/p3Var.pl?Function=DEC&Id=45152

[5] http://www12.statcan.gc.ca/nhs-enm/2011/ref/dict/pop001-eng.cfm

[6] http://www12.statcan.gc.ca/nhs-enm/2011/ref/dict/pop036-eng.cfm

[7] http://www23.statcan.gc.ca/imdb/p2SV.pl?Function=getSurvey&SDDS=3701

[8] https://www.statcan.gc.ca/eng/subjects/standard/naics/2017v2/index n