



Fresno City College

Fresno City College

ECONOMIC OVERVIEW AND PROGRAM DEMAND GAP ANALYSIS

JULY 2018



 Emsi

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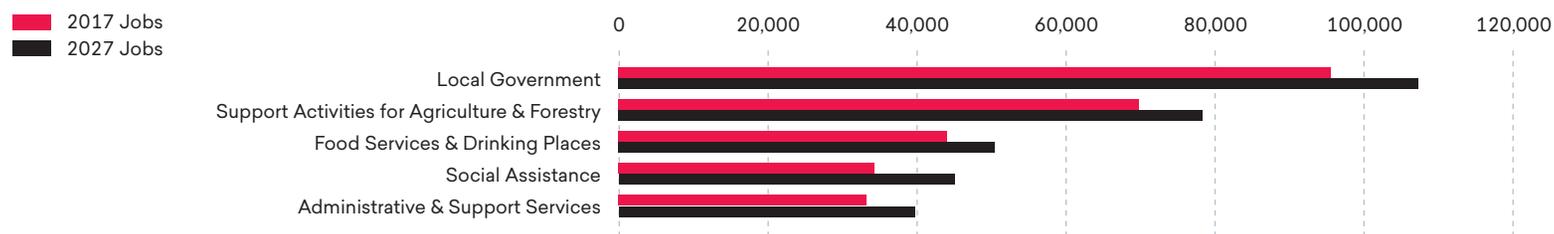


EXECUTIVE SUMMARY

Fresno City College (FCC) is a public, two-year postsecondary educational institution in California. The college offers a wide range of courses at the certificate, associate degree, associate degree for transfer, and non-credit program levels. For purposes of this report, FCC serves a region beyond Fresno. This region, called the FCC Service Region, is comprised of four counties in California: Fresno,

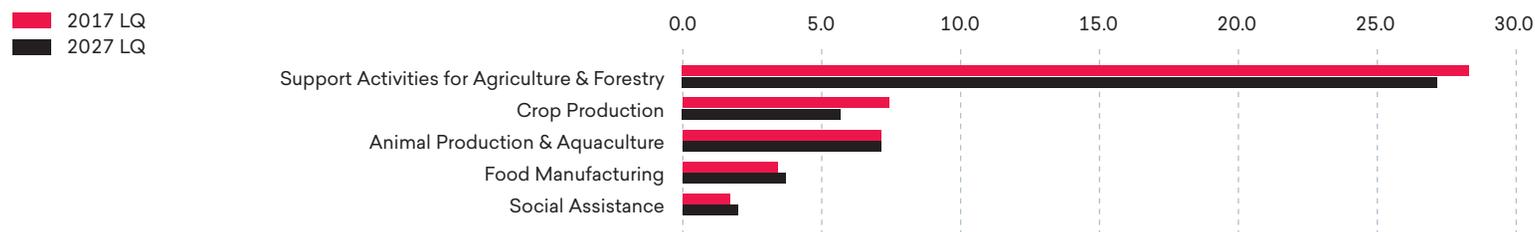
Kings, Madera, and Tulare Counties. This report outlines the region's economy and provides a program demand gap analysis to determine how well FCC's program offerings satisfy regional workforce demand. This report also offers recommendations for new program development. The following figures and table display key findings of the analyses.

FIGURE 1: Top Industry Subsectors in the FCC Service Region by Jobs



Source: Emsi Employees & Self-Employed 2018.1.

FIGURE 2: Top Industry Subsectors in the FCC Service Region by Employment Concentration (LQ)



Source: Emsi Employees & Self-Employed 2018.1.



ECONOMIC OVERVIEW

Figure 1, on the previous page, displays the top five industry subsectors in terms of employment in the FCC Service Region, and Figure 2 shows the top five industry subsectors in terms of employment concentrations, referred to as location quotients (LQs).

Across all of FCC Service Region's industry subsectors, six are within the top 15 in terms of jobs and relatively large LQs. The appearance of these industry subsectors provides an indication of their strength in the FCC Service Region's economy and offers the college insight into potential employment opportunities for its students. Many colleges across the region offer a similar range of programs, this data shows where FCC may need to specialize its programs to meet the specific needs of the region's businesses. These six industry subsectors are:

- Local Government
- Support Activities for Agriculture & Forestry
- Social Assistance
- Crop Production
- Food Manufacturing
- Animal Production & Aquaculture

PROGRAM DEMAND GAP ANALYSIS

The program demand gap analysis provides results across all of FCC's certificate, associate degree, associate degree for transfer, and non-credit program levels. The analysis connects the college's program completers with the availability of regional job openings. For FCC's non-credit courses, the analysis is similar in that it connects the college's completers with the availability of regional jobs,

regardless of the industry or program, but without the additional reference to non-credit program completers from other postsecondary educational institutions in the FCC Service Region. Furthermore, the analysis focuses on the gaps and surpluses in the programs by award level. A gap or surplus larger than 400 is considered beyond normal labor market fluctuations and therefore an area of consideration for program realignment.

There are 17 programs that have a significant gap of 400 or more, considering the FCC Service Region's workforce demand. Figures 3 and 4 show the program gaps at the certificate and associate degree levels, respectively. At the associate degree for transfer level, there are three programs with a significant gap (Figure 5). Business Administration has the largest, with a gap of more than 2,000 job openings. The occupational gaps within each of the programs with a significant gap and their median hourly wage rates indicate that FCC should consider expanding many of its programs, including those related to business and construction.

FCC offers more than 70 non-credit courses, these have been condensed into 22 groups using Taxonomy of Programs (TOP) codes.¹ Using a customized non-credit course-to-occupation map, the non-credit courses are analyzed using similar methods to the program demand gap analysis.

As shown in Figure 6, one non-credit courses have a significant gap. The Manufacturing and Industrial Technology program group has a gap of 2,017 which is comprised of the Industrial Training - Industrial Services & Warehouse Tech Non-Credit Certificate.²

¹ TOP was first published in 1979 and developed by the California Community College system.

² Non-credit programs are grouped by their TOP code.



■ Average Annual Job Openings
 ■ Average Annual Regional Program Completers

FIGURE 3: Significant Certificate Level Gaps



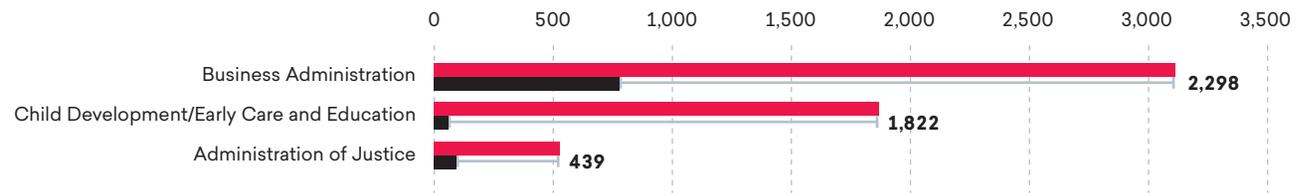
Source: Emsi program demand gap model.

FIGURE 4: Significant Associate Degree Level Gaps



Source: Emsi program demand gap model.

FIGURE 5: Significant Associate Degree for Transfer/Bachelors Level Gaps



Source: Emsi program demand gap model.

FIGURE 6: Significant Gaps for Non-Credit Courses*



* Non-credit programs are grouped into TOP codes.

Source: Emsi program demand gap model.



PROGRAM ADDITIONS

Fifty programmatic areas of opportunity have been identified across the certificate, associate, and associate degree for transfer level programs in the program demand gap analysis, many of which are related to supervisory roles at the certificate level, and medical occupations are identified at the associate degree level. At the asso-

ciate degree for transfer level, the occupations relate to business, education, and medical occupations. Across all award levels, many program additions are related to FCC's current program offerings, which indicates an opportunity for a curriculum adjustment to better align with the region's current and projected labor market demand. A selection of these occupations appears in Table 2.

TABLE 2: Program Additions by Education Level*

SOC CODE	SOC TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL REGIONAL COMPLETERS	GAP	MEDIAN HOURLY WAGE	EDUCATION LEVEL
53-3032	Heavy & Tractor-Trailer Truck Drivers	1,280	102	1,177	\$19.06	Certificate
43-4051	Customer Service Representatives	829	13	816	\$15.27	Certificate
45-1011	First-Line Supervisors of Farming, Fishing, & Forestry Workers	302	5	297	\$15.48	Certificate
53-3022	Bus Drivers, School or Special Client	251	24	227	\$16.32	Certificate
47-2111	Electricians	237	9	227	\$25.29	Certificate
29-2061	Licensed Practical & Licensed Vocational Nurses	247	34	212	\$23.64	Certificate
31-2022	Physical Therapist Aides	38	12	26	\$14.38	Associate
29-2032	Diagnostic Medical Sonographers	17	0	17	\$38.07	Associate
29-2031	Cardiovascular Technologists & Technicians	15	0	15	\$32.14	Associate
31-2021	Physical Therapist Assistants	25	11	14	\$30.07	Associate
25-3098	Substitute Teachers	643	0	643	\$17.69	Bachelor's
41-3099	Sales Representatives, Services, All Other	403	2	402	\$21.68	Bachelor's
13-1071	Human Resources Specialists	138	22	117	\$27.83	Bachelor's
25-2012	Kindergarten Teachers, Except Special Education	111	3	108	\$30.48	Bachelor's
11-3031	Financial Managers	107	1	106	\$43.61	Bachelor's
39-9031	Fitness Trainers & Aerobics Instructors	159	54	105	\$22.48	Bachelor's

* SOC refers to the Standard Occupational Classification system used to classify occupations. Average annual job openings represent regional data from 2017 to 2027.

Source: Emsi program demand gap model.



INTRODUCTION

An efficient labor market requires a seamless flow of skilled workers between the educational institutions that train them and the employers that hire them. One factor behind workforce misalignment stems from when the needs of the employers evolve differently than the educational programs that train their workers.

These misalignments may happen at different times and for different reasons: 1) employer training becomes more tailored and comprehensive; 2) businesses come and go, and certain educational programs become more or less pertinent to a specific region; 3) rapid advances in technology and business create curriculum needs that few educational institutions possess; and 4) as economic conditions shift, businesses have different hiring requirements of their employees.

In light of these dynamics, an up-to-date understanding of the regional economy and the demand for skilled labor is vital to the planning efforts of colleges and universities seeking to adapt their program offerings to the requirements of an ever-changing workforce.

To gain better insight into economic conditions and workforce trends, Fresno City College (FCC) partnered with Emsi, a Career-BUILDER company and leading provider of economic impact studies

and labor market data. We conducted an overview of the region's economy, provided a program demand gap analysis of FCC program offerings, and identified potential new program offerings.

The program demand gap analysis is performed by assessing the supply and demand of skilled workers and identifying the educational programs that need to be adapted in order to fill any existing or future gaps. The analysis weighs the educational output of FCC and other postsecondary educational institutions in the region against the number of job openings related to the college's program offerings to determine whether a deficit or an oversupply of skilled workers exists. The goal of the analysis is to provide FCC with relevant data and information that it can use when solving problems and making decisions about current and future program development.

IMPORTANT NOTE

This analysis is intended to serve as a point of departure for FCC as the college discusses regional workforce needs. A deficit (gap) or oversupply (surplus) of workers in a particular occupation category represents a potential problem for the region, making it important for each program and occupation group to be evaluated by the college on a case-by-case basis. The purpose of this analysis is, therefore,

to initiate the conversation on evaluating program effectiveness. Once evaluated internally within the college, specific implications may be considered for programs with substantial gaps or surpluses.

It must be noted that our analysis does have its limitations in that only the education supply pipeline is considered. This is due to data availability at the county and school levels. However, other sources—unemployed workers, industry trained pipelines, workers

migrating to the region, and job changers from other occupational categories—can also be a source of skilled workers. These types of considerations are useful when evaluating specific types of occupations. Publicly available data sources are limited in accounting for this, and consequently these labor sources are unavailable for Emsi analysis. Primary data collection methods (i.e., interviews and surveys) are among the only ways to obtain information on the other sources for skilled workers.



CHAPTER 2:

ECONOMIC OVERVIEW

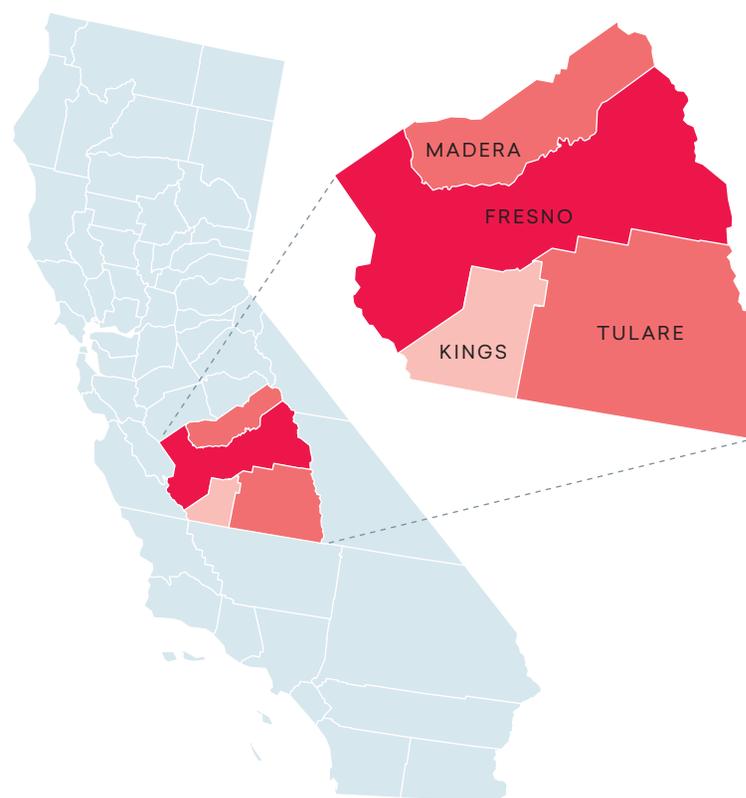
Before looking at the results of the program demand gap analysis, an institution should first consider the economic structure of its region, referred to in this report as the FCC Service Region and defined as Fresno, Kings, Madera, and Tulare Counties in California (Figure 2.1). Identifying the key driving industries within the region is an important first step for three reasons: 1) it helps FCC understand where the college should logically target its efforts, 2) it helps to reveal whether there are industries that may be overlooked as a result of recent economic growth, and 3) it helps identify the top occupations within those key driving industries.

In addition to knowing the industry structure of the region, it is important to have an understanding of the workforce—how connected the region’s workers are to the surrounding community and the educational attainment of workers in the region. To these ends, this chapter provides an overview of the region’s industry composition, worker commuting patterns, and educational attainment of residents. Supporting data tables are available in Appendix 2.

INDUSTRY COMPOSITION

Evaluating current and future employment by industry provides information on the economic diversification of a given region. Understanding the industry mix of the region is important for drawing connections to the occupations and companies that are in-demand

FIGURE 2.1: Map of the FCC Service Region



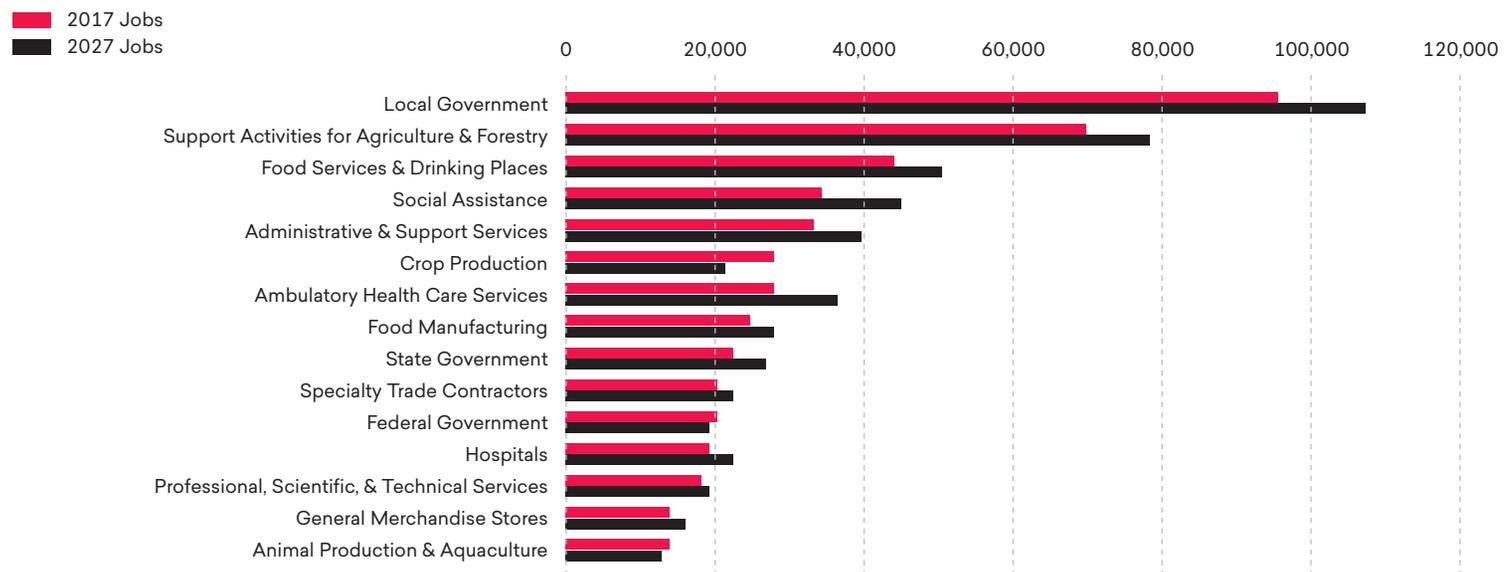
Source: Emsi Analyst.

in the region. The North American Industry Classification System (NAICS) is the structure used by federal agencies to classify business establishments based on their production process (although the final product or service is usually similar for the firms in a given industry). NAICS applies a six-digit hierarchical coding system to organize more than 1,100 detailed industries in the U.S. For this analysis, Emsi has aggregated these detailed industries into their three-digit NAICS codes, referred to as industry subsectors. Figure 2.2 presents the 15 largest industry subsectors in the FCC Service Region, by their 2017 job counts, and also shows the industry subsectors' projected growth or decline over the next decade. For more detail across all three-digit industry subsectors, please refer to Appendix 2.

As shown, the Local Government industry subsector had the highest number of jobs in the FCC Service Region in 2017 and is expected to remain the top regional employer. The Support Activities for Agriculture & Forestry industry subsector and the Food Services & Drinking Places industry subsector are the next largest in terms of jobs. Three of the top 15 industry subsectors are expected to contract between now and 2027 – the Crop Production industry subsector, the Federal Government industry subsector, and the Animal Production & Aquaculture industry subsector.

Figure 2.3, on the next page, shows the employment concentration of the industry subsectors in the FCC Service Region, measured in terms of location quotients (LQs). LQs are used to assess national

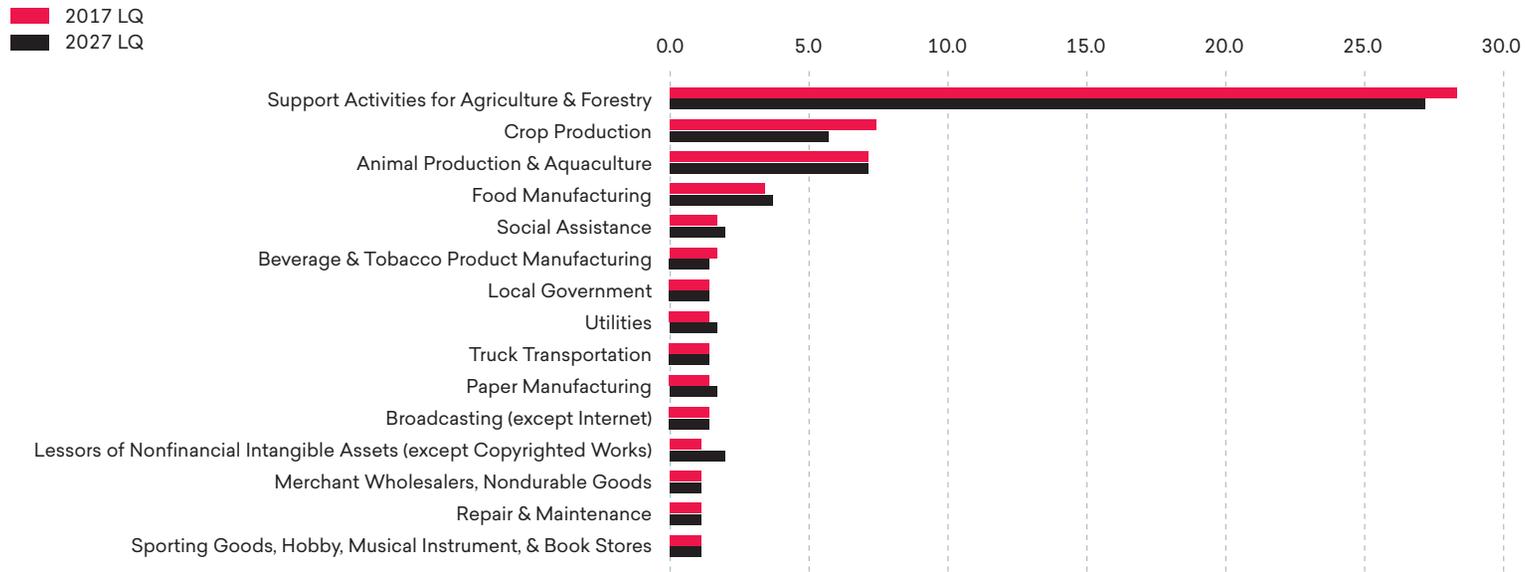
FIGURE 2.2: Jobs by Industry Subsector in the FCC Service Region, 2017 and 2027



Source: Emsi Employees & Self-Employed 2018.1.



FIGURE 2.3: Employment Concentration (LQ) by Industry Subsector in the FCC Service Region, 2017 and 2027



Source: Emsi Employees & Self-Employed 2018.1.

competitiveness by comparing the concentration of employment in a given industry against the concentration of employment for that same industry across the nation. An LQ equal to one means that the percentage of total employment comprised by an industry in the region exactly matches the percentage of total employment comprised by that industry in the nation. An LQ greater than one means that the industry comprises a greater proportion of total employment in the region than it does in the nation.

High LQs (usually anything greater than 1.2) are an indication that the region has a comparative advantage or specialization in certain industry subsectors relative to the rest of the nation or potentially to other competing regions. When evaluated jointly with job counts

and expected job growth, high LQs give a sense of the industry subsectors that have the greatest potential for workforce investment and where regional economic development professionals are likely to be focusing their efforts. This information is of particular importance to educators seeking to engage in larger conversations with other organizations about aligning program offerings with workforce needs.

As shown in Figure 2.3, the Support Activities for Agriculture & Forestry industry subsector has the largest LQ at 28.21. It is expected to decrease between now and 2027, but still remain very concentrated. The Crop Production, Animal Production & Aquaculture, and Food Manufacturing industry subsectors also have relatively large LQs.



Over the next 10 years, the Lessors of Nonfinancial Intangible Assets (except Copyrighted Works) industry subsector is projected to have the largest LQ growth in the FCC Service Region.

OCCUPATIONS WITHIN KEY INDUSTRY SUBSECTORS

Six industry subsectors are found in both Figure 2.2 and Figure 2.3 because they are top employers and have high LQs. These industry subsectors are Local Government; Support Activities for Agriculture & Forestry; Social Assistance; Crop Production; Food Manufacturing; and Animal Production & Aquaculture. Their appearance in the figures provides an indication of their relative strength in the FCC Service Region, and thus, we identify the most common occupations within the six industry subsectors, called the staffing pattern.³ Not only do the industry subsectors' staffing patterns provide insight into the region's labor market demand, but by extension, the demand for the college's program offerings.

Three of the key industry subsectors are related to agriculture. These are Support Activities for Agriculture & Forestry, Crop Production, and Animal Production & Aquaculture. Support Activities for Agriculture & Forestry is the second largest industry subsector in the FCC Service Region but had the highest LQ by far. The largest occupation within this industry subsector, accounting for nearly 75% of the employment within the industry, is farmworkers & laborers, crop, nursery, & greenhouse. This occupation is expected to grow by 11% between now and 2027, but the median hourly earnings are low

at only \$10.23. Farmworkers & laborers, crop, nursery, & greenhouse is also the top occupation for the Crop Production industry subsector and the Animal Production & Aquaculture subsector, although this occupation typically requires no formal education. Occupations within the industry subsectors that the college could train for include heavy & tractor-trailer truck drivers; bookkeeping, accounting, and auditing clerks; and agricultural & food science technicians. These occupations would be suited for certificate or associate degree levels. The college could also provide associate degree for transfer opportunities for occupations such as accountants & auditors, general & operations managers, and agricultural inspectors.

Another key industry subsector identified is food manufacturing. The presence of this industry subsector is likely due to the large agricultural presence in the region, although the staffing pattern is considerably different than the agricultural industry subsectors. The largest occupation within this industry subsector, accounting for nearly 10% of the employment, is packaging & filling machine operators & tenders. This occupation is expected to grow by 9% between now and 2027, but the median hourly earnings are low at only \$12.77 and typically only requires a high school diploma. Occupations that the college could train for at either the associate degree or certificate level include agricultural & food science technicians and bookkeeping, accounting, & auditing clerks. There are a number of occupations with high hourly wages, but the present workforce currently has a high school degree. This could be because older workers may have entered the workforce before a college degree was a minimum qualification for that occupation. Examples of these occupations include first-line supervisors of production & operating workers; industrial machinery mechanics; and sales representatives, wholesale & manufacturing, except technical and scientific products.

The staffing pattern for the Social Assistance industry subsector

³ The top occupations, in terms of the percent of total jobs in an industry, are identified using data from the National Occupational Employment Statistics program, projections from the National Industry-Occupation Employment Matrix, and Emsi's proprietary employment data.



shows many health occupations, such as personal care aides, home health aides, and nursing assistants, although all of them have relatively low median hourly wages. Also included within the industry subsector's staffing pattern are many social welfare type occupations related to children and mental health. Occupations that fall into this category include childcare workers; preschool teachers, except special education; social & community service managers; and mental health counselors. There are a few occupations that the college could train for with higher median hourly wages, such as licensed practical & licensed vocational nurses, psychiatric technicians, and occupational therapy assistants.

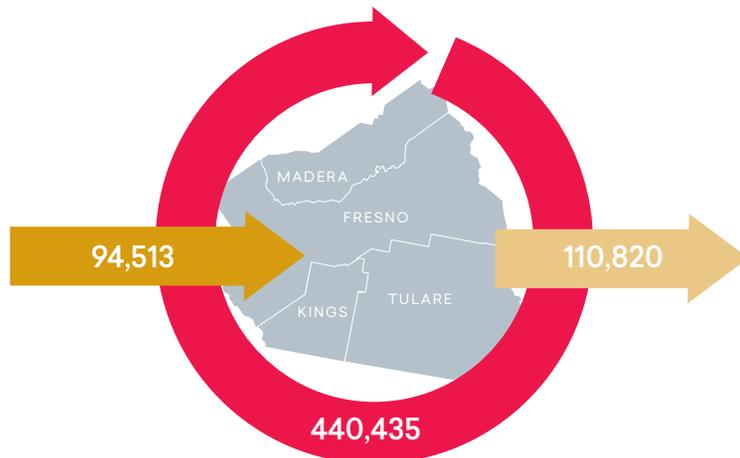
The Local Government industry subsector is the largest in the FCC Service Region and is expected to add over 10,000 jobs between

now and 2027. The top three occupations are all related to education. In fact, over one-third of the occupations in this industry subsector are related to public education. These top occupations are elementary school teachers, except special education; substitute teachers; and teacher assistants. Other occupations in this industry subsector with high employment include office clerks, general; police & sheriff's patrol officers; and firefighters.

See Chapter 3 for the results of the program demand gap analysis that specifically targets the six industry subsectors with high employment and large LQs. Appendix 2 provides a complete list of the top 25 occupations, with employment projections, related to the six industry subsectors.

FIGURE 2.4: FCC Service Region Job Inflow and Outflow

- 94,513 - Employed in the FCC Service Region but living outside
- 440,435 - Living and employed in the FCC Service Region
- 110,820 - Living in the FCC Service Region but employed outside



Source: 2014 Census LEHD.

WORKFORCE COMMUTING PATTERNS

The Longitudinal Employer-Household Dynamics (LEHD) program⁴ at the Census Bureau provides information on the residential and employment locations of workers. This provides community leaders with an idea of the commuting patterns of regional employees. More specifically, it demonstrates the extent to which employees commute to the region for work and/or residents commute to surrounding communities for work. The results of the LEHD data provide additional context as to how workers from outside the region could be filling current gaps or how the region's workers could be out-commuting when there is a surplus of available jobs. The concepts of a "gap" and "surplus" are discussed in greater detail in Section 1 of Chapter 3.

⁴ LEHD is an innovative program that uses modern statistical and computing techniques to combine federal and state administrative data on employers and employees with core Census Bureau censuses and surveys while protecting the confidentiality of people and firms that provide the data.



Figure 2.4 presents the inflow and outflow of jobs to and from the FCC Service Region. There are 534,948 jobs in the region, with 440,435 filled by residents and 94,513 going to people living outside the region. Additionally, 110,820 residents commute outside the region for work. The figure illustrates that slightly more workers out-commute than in-commute. Supporting data tables can be found in Appendix 2.

EDUCATIONAL ATTAINMENT

This section describes the educational attainment of the population in the FCC Service Region for adults aged 25 years and older. The data are useful for educators targeting specific population groups that have low education levels. The region's educational attainment is presented by gender and ethnicity and broken out according to the following categories: 1) less than a high school diploma, 2) high school diploma, 3) some college,⁵ 4) associate degree, 5) bachelor's degree, and 6) graduate degree and higher.

⁵ The "Some College" category includes individuals who attended college but did not successfully obtain a degree and individuals who have received a postsecondary vocational award or professional certification but did not receive an associate or bachelor's degree.

Figure 2.5 displays the educational attainment of the overall adult population in the FCC Service Region, without reference to gender and ethnicity. In the FCC Service Region, 53% of the adult population has a high school diploma or less, which is more than the national average of 42%. Out of all the education categories in Figure 2.5, the people who are most likely to seek education and training from FCC are those in the "Less than High School Diploma," "High School Diploma," and "Some College" categories. Together, these categories total 809,497 people, or 76% of the entire adult population in the region.

The distribution of educational attainment by gender is fairly even in the FCC Service Region. Females are more likely to have a graduate degree and higher as compared to males, and males are more likely to have a high school diploma or below. The category "Some College" accounts for 22% and 24% of adult males and females, respectively. This information appears in Figure 2.6, on the next page.

Table 2.1 shows the adult population in the FCC Service Region by ethnicity, and Figure 2.7 displays its educational attainment. As shown in Table 2.2, 50% of the region's adult population is in the "Hispanic, All Types" category. Another 37% of adults are in the "White, Non-Hispanic" and 8% are in the "Asian, Non-Hispanic"

FIGURE 2.5: Educational Attainment of the Adult Population in the FCC Service Region, California, and the U.S.

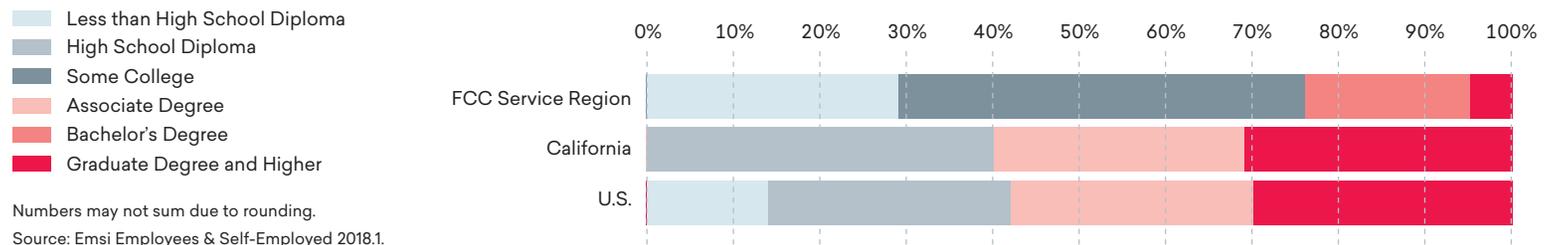
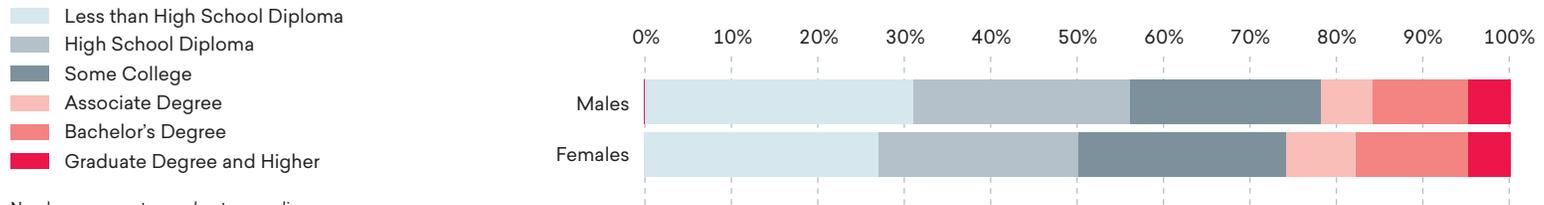


FIGURE 2.6: Educational Attainment of the Adult Population in the FCC Service Region by Gender



Numbers may not sum due to rounding.
Source: Emsi Employees & Self-Employed 2018.1.

categories, the two next largest proportions. Altogether, less than 3% of the region’s adult population identify as two or more races, non-Hispanic; American Indian or Alaskan Native, non-Hispanic; and Native Hawaiian or Pacific Islander, non-Hispanic.

TABLE 2.3: Adult Population in the FCC Service Region by Ethnicity, 2017

ETHNICITY	2017 POPULATION	% OF TOTAL
Hispanic, All Types	528,235	49.5%
White, Non-Hispanic	394,211	36.9%
Asian, Non-Hispanic	80,419	7.5%
Black, Non-Hispanic	41,804	3.9%
Two or More Races, Non-Hispanic	13,319	1.2%
American Indian or Alaskan Native, Non-Hispanic	8,106	0.8%
Native Hawaiian or Pacific Islander, Non-Hispanic	1,404	0.1%
Total	1,067,499	100.0%

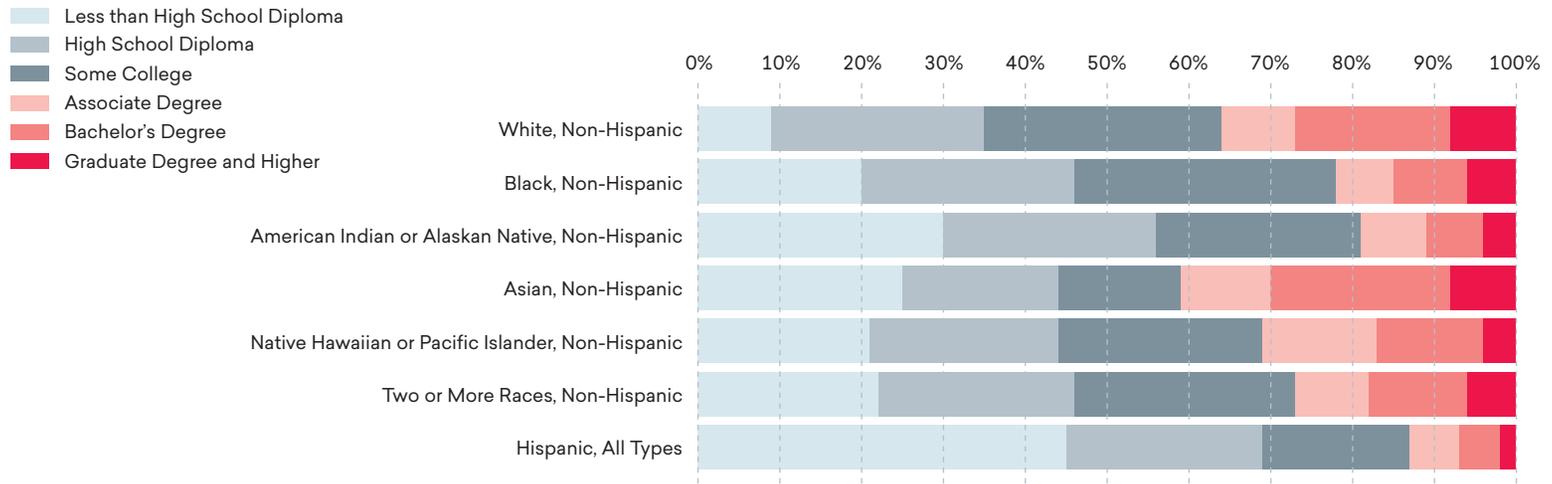
Source: Emsi Employees & Self-Employed 2018.1.

Figure 2.7, on the next page, displays the educational attainment of the adult population by ethnicity. The “White, Non-Hispanic” category has the highest percentage of adults with a postsecondary education (65%). The “Asian, Non-Hispanic” category follows with 56%. The “Hispanic, All Types” and “American Indian or Alaskan Native, Non-Hispanic” categories have the lowest levels of educational attainment. For these groups, only 31% and 44%, respectively, of the adult population has had some sort of postsecondary degree training. These data suggest that there are many opportunities to increase educational attainment across all ethnic groups.

One important point to notice is that within the region there are significantly more people with “Less than High School Diploma” level of education, likely in relation to the large amount of agriculture workers. This may indicate the need for General Education Development (GED), English as a Second Language (ESL), and remedial education courses.



FIGURE 2.7: Educational Attainment of the Adult Population in the FCC Service Region by Ethnicity



Numbers may not sum due to rounding.

Source: Emsi Employees & Self-Employed 2018.1.



PROGRAM DEMAND GAP ANALYSIS

With the region's top industry subsectors and regional workforce in mind, the program demand gap analysis can now be conducted, answering the following question:

Where are there misalignments between the workforce demand and the supply of college completers?

This chapter outlines the deficit of FCC's program completers to the workforce (gap), as well as the oversupply of completers to the workforce (surplus). The occupations directly related or mapped to the significant gaps are also displayed. Before providing and discussing the results, we will go over the interpretation of the results.

INTERPRETATION

The terms used in the analysis are as follows:

Gap: Represents a deficit, or when there are more job openings in a particular occupation than there are completers from higher education institutions within the region. If left unaddressed, a gap may lead to missed opportunities for economic growth and put stress on local businesses to find the necessary talent elsewhere. Significant gaps translate into higher human resources costs and decreased efficiencies in the economic system. They also provide an oppor-

tunity for institutions to develop new programs and/or strengthen their current programs.

Surplus: Represents an oversupply, or when there are more completers from regional higher education institutions than there are job openings in a particular occupation. If left unaddressed, significant surpluses may lead to higher unemployment rates or higher attrition rates—the college could be educating a workforce that is leaving the region after program completion because of a lack of job opportunities. Values in parentheses in the result tables represent a surplus.

One important consideration when reviewing the results is that not all gaps or surpluses indicate necessary adjustments. Due to labor market inefficiencies, it is common for most program categories to face a certain level of gap or surplus. This means only significant gaps or surpluses should be reviewed to allow for focus on the areas of concern. Given the size and characteristics of the FCC Service Region, any gap or surplus within 400 jobs either above or below zero should be considered within the normal range of labor market fluctuations.

The program gaps and surpluses are discussed by award level below and presented as figures and tables. The purpose of the figures is to show the gap between job demand and the supply of program

completers. The job demand is measured as the total number of annual job openings, on average, from 2017 to 2027. This total is calculated as the sum of the average annual job openings for every occupation mapped to the program. The job openings, by occupation, are not a gross measure of job openings available in the region; they have been weighted by the program's award level. In addition, the job openings have been de-duplicated across programs, when an occupation is mapped to more than one program. As for supply, it is shown as the average number of program completers in the region, by award level, between 2015 and 2017.⁶ The gap, then, is the difference between job openings and program completers. See Appendix 3 for FCC's program to occupation map and Appendix 4 for a detailed description of the report's methodology.

A greater amount of data is presented in the tables. The first set shows the gaps and surpluses across all the programs offered at FCC by award level. The tables include the Taxonomy of Programs (TOP) code and title, the average annual number of job openings associated with the program (which have been de-duplicated using the process outlined in Appendix 4), the average annual program completers from the region and from FCC, and the gap or surplus for the FCC Service Region.

The second set of tables provides insight into the occupations mapped to the programs with a significant gap, by award level, and programs' occupational gaps and surpluses. The tables include the TOP code, TOP title, and occupations mapped to the program by their Standard Occupational Classification (SOC) codes and titles.

6 The average annual completers' data for FCC was updated to the years 2015 to 2017 and reviewed for accuracy by FCC.

The regional job counts, by occupation, are shown for 2017 and 2027 with the change in jobs and average annual job openings for those years.

CERTIFICATE LEVEL ANALYSIS

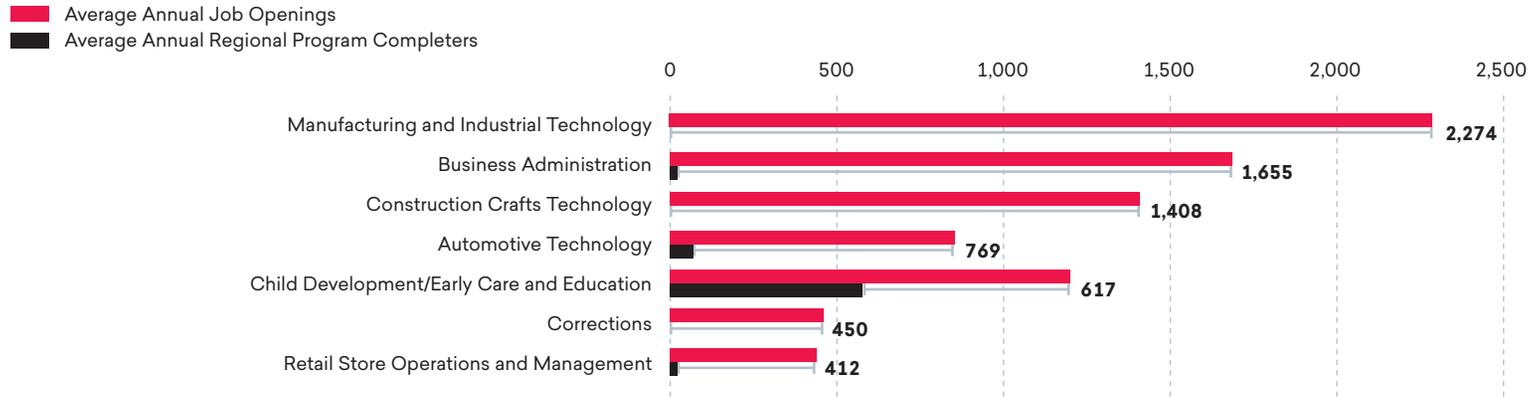
FCC has 53 certificate level programs at the college. The largest certificate level gap, at 2,274 job openings, is in the Manufacturing & Industrial Technology program (Figure 3.1, on the next page). The gap takes annual reported openings at the certificate level of education into account and adjusts for other programs in the region that train for occupations related to Manufacturing & Industrial Technology. Within the program, FCC produces three average annual completers and is not the only institution with completers in this program. (Table 3.1).

The next step in the program demand gap analysis is to take a closer look at the occupations mapped to a certificate in the program and their median hourly wage rates. As shown in Table 3.2, there are a wide range of occupations mapped to Manufacturing & Industrial Technology, such as industrial engineering technicians and packaging & filling machine operators & tenders. The median hourly wage of industrial engineering technicians, the highest paid occupation mapped to the program, is \$29.33, well above California's state minimum wage of \$11.00 per hour, however there is projected to be zero annual openings.⁷ Program expansion looks promising, but a

7 California's minimum wage as of January 1, 2017 is \$11.00 per hour for employers with 26 or more employees and \$10.50 per hour for employers with less than 25 employees. Source: State of California Department of Industrial Relations.

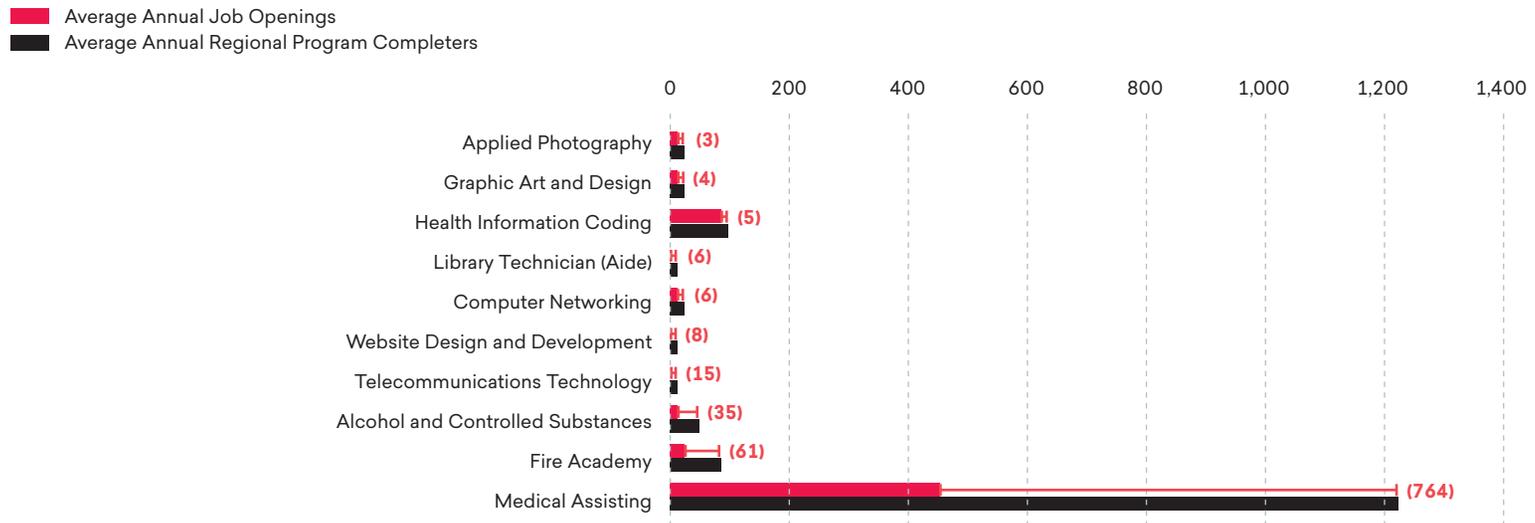


FIGURE 3.1: Significant Gaps for Certificate Level Programs at FCC



Source: Emsi program demand gap model.

FIGURE 3.2: Largest Surpluses for Certificate Level Programs at FCC



Source: Emsi program demand gap model.



TABLE 3.1: Supply and Demand for Certificate Level Programs at FCC

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
956.00	Manufacturing and Industrial Technology	2,285	11	3	2,274	\$14.67
505.00	Business Administration	1,678	23	17	1,655	\$26.40
952.00	Construction Crafts Technology	1,411	3	2	1,408	\$15.78
948.00	Automotive Technology	841	71	2	769	\$13.39
1305.00	Child Development/Early Care and Education	1,203	585	53	617	\$11.57
2105.10	Corrections	456	6	3	450	\$34.78
506.50	Retail Store Operations and Management	430	18	0	412	\$16.48
956.50	Welding Technology	363	65	9	299	\$19.70
514.00	Office Technology/Office Computer Applications	353	105	21	248	\$15.92
514.20	Medical Office Technology	267	90	19	177	\$15.99
2104.00	Human Services	204	45	38	159	\$19.80
2105.00	Administration of Justice	336	186	59	149	\$17.29
502.00	Accounting	175	31	9	144	\$20.85
934.00	Electronics and Electric Technology	127	21	10	106	\$18.07
511.00	Real Estate	96	1	1	96	\$22.38
1307.10	Restaurant and Food Services and Management	145	52	1	93	\$14.39
802.00	Educational Aide (Teacher Assistant)	105	22	22	83	\$16.43
1002.00	Art	90	11	11	79	\$19.38
1402.00	Paralegal	110	32	20	78	\$23.18
1250.00	Emergency Medical Services	111	48	1	64	\$15.51
936.00	Printing and Lithography	45	1	1	44	\$15.88
946.00	Environmental Control Technology	84	43	15	42	\$21.61
934.20	Industrial Electronics	48	16	16	33	\$21.34
949.00	Automotive Collision Repair	33	2	2	31	\$18.69
809.00	Special Education	29	0	0	29	\$20.57
514.10	Legal Office Technology	41	13	1	28	\$20.60
1217.00	Surgical Technician	15	0	0	14	\$22.37

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
1306.20	Dietetic Services and Management	18	5	3	13	\$14.16
702.00	Computer Information Systems	63	53	0	10	\$28.79
201.00	Architecture and Architectural Technology	35	26	2	9	\$26.83
1005.00	Commercial Music	11	2	2	8	\$18.50
953.00	Drafting Technology	10	4	4	6	\$25.34
702.10	Software Applications	44	38	0	6	\$15.11
1306.00	Nutrition, Foods, and Culinary Arts	5	0	0	4	\$14.34
957.20	Construction Inspection	2	1	1	1	\$26.93
850.10	Sign Language Interpreting	4	4	4	0	\$20.48
1305.60	Parenting and Family Education	0	1	1	(0)	\$17.51
2133.00	Fire Technology	8	9	2	(1)	\$32.08
709.00	World Wide Web Administration	0	2	1	(1)	\$27.01
1305.20	Children with Special Needs	10	12	4	(2)	\$15.69
2202.20	Archaeology	0	2	2	(2)	\$23.26
2105.40	Forensics, Evidence, and Investigation	1	4	4	(2)	\$30.33
708.00	Computer Infrastructure and Support	7	9	9	(3)	\$36.79
1012.00	Applied Photography	18	21	21	(3)	\$18.16
1030.00	Graphic Art and Design	11	16	4	(4)	\$20.45
1223.10	Health Information Coding	90	95		(5)	\$15.91
1602.00	Library Technician (Aide)	4	10	10	(6)	\$17.13
708.10	Computer Networking	12	18	7	(6)	\$36.49
614.30	Website Design and Development	2	10	2	(8)	\$22.83
934.30	Telecommunications Technology	1	16	16	(15)	\$46.69
2104.40	Alcohol and Controlled Substances	11	46	33	(35)	\$17.16
2133.50	Fire Academy	19	81	45	(61)	\$30.66
1208.00	Medical Assisting	457	1,221	9	(764)	\$15.09

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.



TABLE 3.2: Occupations Related to Significant Gap Programs at the Certificate Level at FCC

SOC	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB	MEDIAN HOURLY WAGE
MANUFACTURING AND INDUSTRIAL TECHNOLOGY						
51-9111	Packaging & Filling Machine Operators & Tenders	4,411	5,032	620	603	\$12.77
51-2092	Team Assemblers	2,695	3,097	402	357	\$12.54
51-3092	Food Batch-makers	1,908	2,056	147	262	\$14.75
51-1011	First-Line Supervisors of Production & Operating Workers	2,422	2,681	259	221	\$23.15
51-9023	Mixing & Blending Machine Setters, Operators, & Tenders	766	840	74	93	\$17.50
51-9012	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	867	932	64	74	\$19.12
51-3093	Food Cooking Machine Operators & Tenders	461	530	69	71	\$12.49
51-9196	Paper Goods Machine Setters, Operators, & Tenders	517	604	87	64	\$16.53
51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	465	492	28	57	\$14.26
51-9192	Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders	365	413	48	52	\$11.87
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	2,026	2,292	266	50	\$14.10
51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	435	477	42	50	\$10.85
53-7011	Conveyor Operators & Tenders	161	190	30	26	\$13.27
51-2022	Electrical & Electronic Equipment Assemblers	541	591	50	25	\$13.17
51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	153	183	31	22	\$12.38
51-9121	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	183	206	23	22	\$15.05
51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	149	185	37	22	\$11.02
51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	181	195	14	22	\$16.99
51-9041	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	152	168	16	21	\$12.93
51-4072	Molding, Core-making, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	182	171	(11)	19	\$13.43
51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	172	146	(26)	16	\$12.83
51-9193	Cooling & Freezing Equipment Operators & Tenders	106	118	12	13	\$13.99
51-9195	Molders, Shapers, & Casters, Except Metal & Plastic	128	142	14	13	\$15.93
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	355	348	(7)	12	\$15.04



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
51-9123	Painting, Coating, & Decorating Workers	109	110	1	12	\$13.02
51-2031	Engine & Other Machine Assemblers	83	89	6	9	\$17.90
51-4062	Patternmakers, Metal & Plastic	86	75	(10)	8	\$16.97
51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	71	79	8	8	\$15.16
51-9191	Adhesive Bonding Machine Operators & Tenders	58	66	8	8	\$16.04
51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	56	64	7	7	\$14.68
51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	189	240	51	5	\$16.27
51-2023	Electromechanical Equipment Assemblers	119	115	(4)	5	\$13.73
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	143	139	(5)	5	\$14.95
51-4081	Multiple Machine Tool Setters, Operators, & Tenders, Metal & Plastic	114	137	22	5	\$14.71
51-4034	Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal & Plastic	136	123	(13)	4	\$14.47
51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	116	107	(8)	3	\$14.66
51-4023	Rolling Machine Setters, Operators, & Tenders, Metal & Plastic	101	92	(9)	3	\$14.05
51-4032	Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal & Plastic	80	72	(7)	2	\$13.49
51-6064	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders	7	16	9	2	\$12.45
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	53	65	13	2	\$24.45
51-6063	Textile Knitting & Weaving Machine Setters, Operators, & Tenders	8	15	7	2	\$11.09
51-6062	Textile Cutting Machine Setters, Operators, & Tenders	11	11	0	2	\$11.42
51-4035	Milling & Planing Machine Setters, Operators, & Tenders, Metal & Plastic	41	38	(2)	1	\$17.38
51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	82	80	(2)	1	\$17.83
51-4061	Model Makers, Metal & Plastic	8	8	1	1	\$21.84
51-4022	Forging Machine Setters, Operators, & Tenders, Metal & Plastic	28	27	(1)	1	\$15.90
51-4192	Layout Workers, Metal & Plastic	23	21	(2)	1	\$19.64
51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	17	17	1	1	\$16.78
51-6061	Textile Bleaching & Dyeing Machine Operators & Tenders	2	4	1	1	\$12.29
51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	26	19	(7)	0	\$20.57



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
17-3026	Industrial Engineering Technicians	43	56	13	0	\$29.33
51-2093	Timing Device Assemblers & Adjusters	0	1	0	0	\$14.89
BUSINESS ADMINISTRATION						
43-9061	Office Clerks, General	13,712	15,258	1,547	635	\$14.74
11-1021	General & Operations Managers	7,732	8,817	1,085	331	\$40.76
43-1011	First-Line Supervisors of Office & Administrative Support Workers	5,387	6,259	873	212	\$24.32
43-6011	Executive Secretaries & Executive Administrative Assistants	1,868	1,954	86	89	\$23.72
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	54	\$28.54
11-3011	Administrative Services Managers	1,194	1,347	153	50	\$36.91
13-1051	Cost Estimators	918	1,010	92	48	\$29.16
11-9021	Construction Managers	1,233	1,172	(61)	47	\$29.55
11-2022	Sales Managers	1,779	1,903	124	39	\$41.17
13-1111	Management Analysts	2,080	2,306	226	35	\$32.57
11-3071	Transportation, Storage, & Distribution Managers	560	598	38	29	\$36.34
11-9199	Managers, All Other	2,483	2,786	303	28	\$20.77
11-3051	Industrial Production Managers	612	672	60	24	\$41.91
11-1011	Chief Executives	1,080	1,134	54	20	\$67.55
11-9151	Social & Community Service Managers	901	1,148	246	17	\$30.92
15-1199	Computer Occupations, All Other	553	600	47	9	\$34.63
11-3061	Purchasing Managers	194	203	8	5	\$43.22
25-1099	Postsecondary Teachers	5,473	6,647	1,174	3	\$35.98
13-1011	Agents & Business Managers of Artists, Performers, & Athletes	33	32	(1)	1	\$21.52
CONSTRUCTION CRAFTS TECHNOLOGY						
47-2061	Construction Laborers	4,611	5,127	516	536	\$14.12
47-2031	Carpenters	3,276	3,218	(58)	290	\$15.27
47-2051	Cement Masons & Concrete Finishers	1,267	1,307	40	148	\$16.31
47-2141	Painters, Construction & Maintenance	1,578	1,491	(87)	128	\$14.67



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
47-2081	Drywall & Ceiling Tile Installers	771	803	32	79	\$19.30
47-2181	Roofers	630	656	26	73	\$20.18
47-2044	Tile & Marble Setters	475	461	(14)	41	\$16.22
47-2121	Glaziers	272	271	(1)	32	\$17.92
47-2073	Operating Engineers & Other Construction Equipment Operators	1,049	1,228	179	25	\$25.50
47-2131	Insulation Workers, Floor, Ceiling, & Wall	117	135	18	15	\$18.77
47-2041	Carpet Installers	172	154	(18)	14	\$14.59
47-2042	Floor Layers, Except Carpet, Wood, & Hard Tiles	74	72	(2)	7	\$17.21
47-2132	Insulation Workers, Mechanical	45	55	10	6	\$20.07
49-9071	Maintenance & Repair Workers, General	6,052	6,843	791	5	\$17.37
47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	1,672	1,790	119	5	\$26.68
47-2043	Floor Sanders & Finishers	19	18	(1)	2	\$13.61
17-3022	Civil Engineering Technicians	220	267	47	2	\$32.03
47-2053	Terrazzo Workers & Finishers	11	11	(1)	1	\$20.10
47-2142	Paperhangers	11	10	(1)	1	\$12.86
47-2211	Sheet Metal Workers	529	600	71	1	\$21.42
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	0	\$28.54
47-4011	Construction & Building Inspectors	232	269	38	0	\$29.46
13-1051	Cost Estimators	918	1,010	92	0	\$29.16
11-9021	Construction Managers	1,233	1,172	(61)	0	\$29.55
25-2032	Career/Technical Education Teachers, Secondary School	271	326	55	0	\$32.98
AUTOMOTIVE TECHNOLOGY						
53-7061	Cleaners of Vehicles & Equipment	2,535	2,949	413	420	\$10.97
49-3023	Automotive Service Technicians & Mechanics	3,747	4,208	461	212	\$14.22
49-9071	Maintenance & Repair Workers, General	6,052	6,843	791	73	\$17.37
49-3021	Automotive Body & Related Repairers	611	668	57	48	\$16.13
49-3093	Tire Repairers & Changers	560	663	104	46	\$11.22



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	1,793	2,063	270	23	\$30.26
49-3022	Automotive Glass Installers & Repairers	57	66	9	7	\$13.20
53-6051	Transportation Inspectors	122	134	12	4	\$28.87
49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	98	70	(28)	4	\$13.44
49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment	70	77	7	3	\$27.89
17-3027	Mechanical Engineering Technicians	37	47	10	2	\$28.42
CHILD DEVELOPMENT/EARLY CARE AND EDUCATION						
25-9041	Teacher Assistants	9,108	10,526	1,418	552	\$13.58
39-9011	Childcare Workers	6,080	5,700	(379)	536	\$8.55
21-1093	Social & Human Service Assistants	2,189	2,727	537	99	\$15.47
21-1021	Child, Family, & School Social Workers	1,723	1,969	246	15	\$19.93
CORRECTIONS						
33-3012	Correctional Officers & Jailers	5,518	6,332	814	331	\$40.01
33-9032	Security Guards	3,716	3,674	(43)	95	\$10.86
33-1011	First-Line Supervisors of Correctional Officers	516	590	75	23	\$56.63
21-1092	Probation Officers & Correctional Treatment Specialists	878	959	81	5	\$35.98
33-1012	First-Line Supervisors of Police & Detectives	256	296	40	1	\$72.48
25-1099	Postsecondary Teachers	5,473	6,647	1,174	1	\$35.98
RETAIL STORE OPERATIONS AND MANAGEMENT						
41-1011	First-Line Supervisors of Retail Sales Workers	5,956	6,551	595	406	\$15.86
13-1022	Wholesale & Retail Buyers, Except Farm Products	378	401	23	18	\$22.49
11-1021	General & Operations Managers	7,732	8,817	1,085	5	\$40.76
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	1	\$28.54

Source: Emsi program demand gap model.



closer examination of the occupations, their growth, and median hourly wage must be made so that the program's courses are aligned with the intended occupational outcomes.⁸

This kind of analysis can be applied to the other program gaps in the table as well. In general, gaps around occupations with high wages should be considered more noteworthy than gaps around occupations with low wages. Also, if the occupational forecasts around a certain gap are not positive, the gap may not be worth further consideration. Keep in mind that there could be other sources of skilled workers filling the gaps, such as unemployed workers or workers from outside the region. See Appendix 5 for a complete list of job projections, and see Appendix 6 for unemployment information by industry and occupation see.

While the gaps are important for building or expanding FCC's programs, the surpluses are equally important. An analysis of the surplus programs ensures that the college is educating and training students with the skills the region's workforce requires. At the certificate level, one program has a significant surplus – the Medical Assisting program, with a surplus of 764. Although FCC only produces nine annual completers for the 457 annual openings, when combined with the other regional institutions, there are a total of 1,221 completers per year, resulting in the large surplus. The Fire Technology program has a surplus of 68, although it has a high median hourly

8 Further research must be conducted before making a final determination, such as top employer identification within the region; business surveys to verify the data; resume and job postings analysis to determine trending skills for individuals with similar educations; industry recommendations on curriculum development; and analysis of the strengths, weaknesses, and capacities of similar programs at other regional higher education institutions. Emsi is available to conduct this research; see your Emsi contact for details.

wage of \$30.66. For programs with a surplus, it is best to determine the current outcomes of graduates to ensure they are finding gainful employment. Some FCC program completers may be competing against completers from other intuitions and may fare better than these other students. Additionally, it is possible that FCC completers of the surplus programs are finding employment in areas outside of the FCC Service Region. A review of placement rates could provide additional information.

In order to give more detail about the demand for the program gaps, Table 3.2, on the previous page, outlines the economic situation for the occupations mapped to the programs with a significant gap.⁹

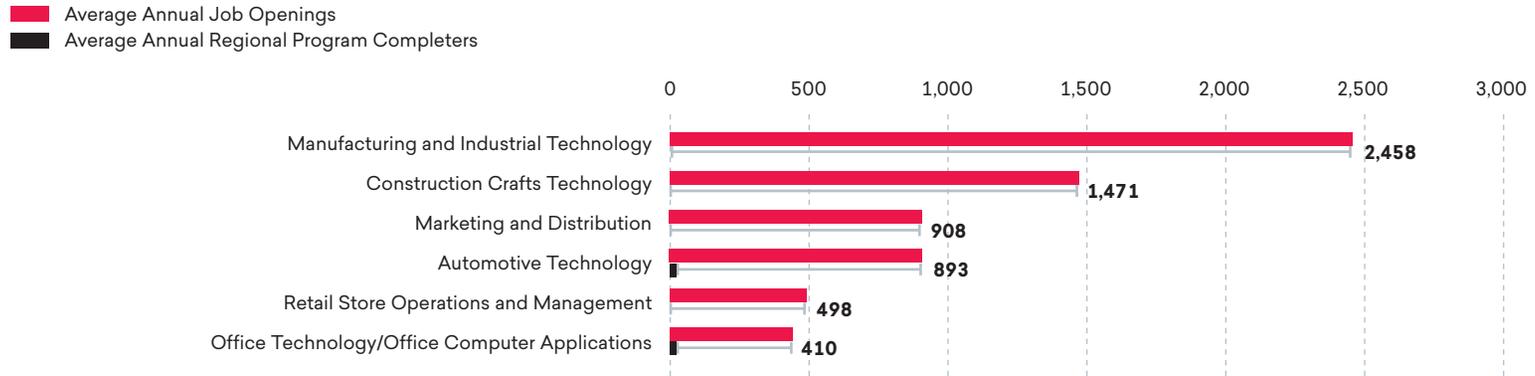
ASSOCIATE DEGREE LEVEL ANALYSIS

The college has 52 associate degree level programs, and Figure 3.3, on the next page, shows the programs with a significant gap. The Manufacturing & Industrial Technology program again has the largest gap, with the difference between openings at the certificate level and associate degree level being 175 openings. This means moving from a certificate to associate degree only offers completers an additional 175 job opportunities over certificate completers. This is followed by the Construction Crafts Technology and Marketing & Distribution programs. As shown in Table 3.3, there are 2,460 average annual job openings in the region for occupations related to the Manufacturing & Industrial Technology program. On average, the college graduates two annual completers, and there are no other institutions with graduates. The second largest gap, at 1,471, was for Construction Crafts Technology. These data take annual

9 For a full list of occupational outlooks, see Appendix 5.

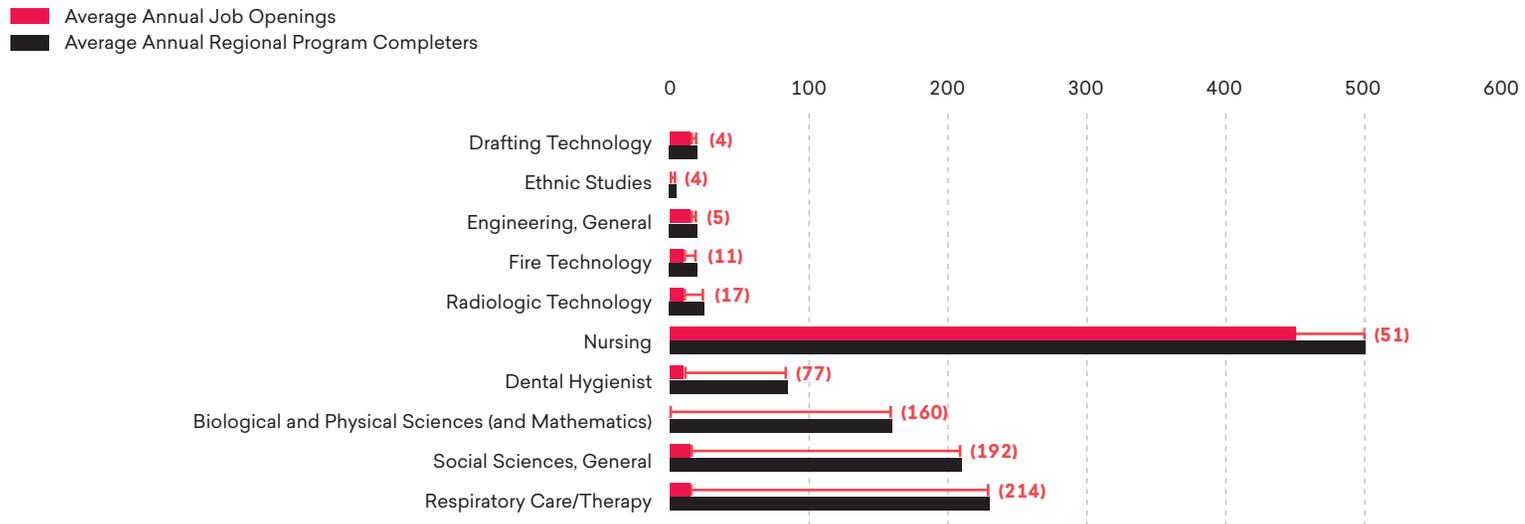


FIGURE 3.3: Significant Gaps for Associate Degree Level Programs at FCC



Source: Emsi program demand gap model.

FIGURE 3.4: Largest Surpluses for Associate Degree Level Programs at FCC



Source: Emsi program demand gap model.



TABLE 3.3: Supply and Demand for Associate Degree Level Programs at FCC

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
956.00	Manufacturing and Industrial Technology	2,460	2	2	2,458	\$14.73
952.00	Construction Crafts Technology	1,474	3	2	1,471	\$15.78
509.00	Marketing and Distribution	911	4	4	908	\$22.30
948.00	Automotive Technology	915	22	12	893	\$13.53
506.50	Retail Store Operations and Management	498	1	0	498	\$16.50
514.00	Office Technology/Office Computer Applications	431	21	5	410	\$15.95
956.50	Welding Technology	397	8	4	389	\$19.69
2105.10	Corrections	549	212	2	336	\$35.16
514.20	Medical Office Technology	327	27	3	300	\$16.01
2104.00	Human Services	263	52	42	211	\$19.96
836.00	Recreation	201	4	4	198	\$11.86
502.00	Accounting	225	36	8	189	\$21.56
1307.10	Restaurant and Food Services and Management	166	0	0	166	\$14.42
934.00	Electronics and Electric Technology	149	13	13	136	\$18.21
802.00	Educational Aide (Teacher Assistant)	134	7	7	127	\$16.45
511.00	Real Estate	117	1	1	116	\$22.40
1402.00	Paralegal	150	40	13	110	\$23.15
946.00	Environmental Control Technology	98	5	3	93	\$21.66
702.00	Computer Information Systems	88	21	4	67	\$29.12
936.00	Printing and Lithography	50	2	2	48	\$15.90
949.00	Automotive Collision Repair	38	3	3	35	\$18.95
201.00	Architecture and Architectural Technology	42	8	4	34	\$26.72
1012.00	Applied Photography	23	6	6	18	\$18.54
1305.20	Children with Special Needs	13	1	1	12	\$15.90
1005.00	Commercial Music	14	3	3	11	\$18.51
850.00	Sign Language	27	18	8	9	\$20.96
1030.00	Graphic Art and Design	16	11	5	5	\$20.56



TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
1303.20	Fashion Merchandising	8	3	1	5	\$27.92
708.10	Computer Networking	18	14	12	4	\$36.51
1901.00	Physical Sciences, General	4	2	1	2	\$21.35
1602.00	Library Technician (Aide)	5	3	3	2	\$17.13
2201.10	Women's Studies	1	0	0	1	\$32.04
957.20	Construction Inspection	2	1	1	1	\$26.96
2104.40	Alcohol and Controlled Substances	13	13	13	0	\$17.26
1101.00	Foreign Languages, General	0	1	1	(0)	\$20.72
839.00	Industrial Arts (Transfer)	0	1	1	(0)	\$33.66
1223.00	Health Information Technology	6	7	7	(1)	\$22.38
1208.00	Medical Assisting	612	613	15	(1)	\$15.03
709.00	World Wide Web Administration	0	2	2	(1)	\$27.04
1008.00	Dance	1	3	3	(2)	\$18.16
1006.00	Technical Theater	1	3	2	(2)	\$24.64
2105.40	Forensics, Evidence, and Investigation	1	4	4	(3)	\$30.37
953.00	Drafting Technology	16	20	6	(4)	\$25.48
2203.00	Ethnic Studies	1	6	6	(4)	\$25.80
901.00	Engineering, General	13	18	1	(5)	\$47.26
2133.00	Fire Technology	11	22	9	(11)	\$32.05
1225.00	Radiologic Technology	10	27	27	(17)	\$27.04
1230.00	Nursing	449	500	276	(51)	\$41.38
1240.20	Dental Hygienist	9	86	25	(77)	\$40.77
4902.00	Biological and Physical Sciences (and Mathematics)	0	160	16	(160)	\$55.01
2201.00	Social Sciences, General	16	208	69	(192)	\$28.39
1210.00	Respiratory Care/Therapy	17	231	14	(214)	\$33.55

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.



TABLE 3.4: Occupations Related to Significant Gap Programs at the Associate Degree Level at FCC

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
MANUFACTURING AND INDUSTRIAL TECHNOLOGY						
51-9111	Packaging & Filling Machine Operators & Tenders	4,411	5,032	620	631	\$12.77
51-2092	Team Assemblers	2,695	3,097	402	384	\$12.54
51-3092	Food Batchmakers	1,908	2,056	147	291	\$14.75
51-1011	First-Line Supervisors of Production & Operating Workers	2,422	2,681	259	247	\$23.15
51-9023	Mixing & Blending Machine Setters, Operators, & Tenders	766	840	74	99	\$17.50
51-9012	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	867	932	64	83	\$19.12
51-3093	Food Cooking Machine Operators & Tenders	461	530	69	76	\$12.49
51-9196	Paper Goods Machine Setters, Operators, & Tenders	517	604	87	69	\$16.53
51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	465	492	28	60	\$14.26
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	2,026	2,292	266	58	\$14.10
51-9192	Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders	365	413	48	56	\$11.87
51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	435	477	42	53	\$10.85
51-2022	Electrical & Electronic Equipment Assemblers	541	591	50	28	\$13.17
53-7011	Conveyor Operators & Tenders	161	190	30	28	\$13.27
51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	153	183	31	24	\$12.38
51-9121	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	183	206	23	23	\$15.05
51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	181	195	14	23	\$16.99
51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	149	185	37	23	\$11.02
51-9041	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	152	168	16	22	\$12.93
51-4072	Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	182	171	(11)	21	\$13.43
51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	172	146	(26)	17	\$12.83
51-9193	Cooling & Freezing Equipment Operators & Tenders	106	118	12	14	\$13.99



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
51-9195	Molders, Shapers, & Casters, Except Metal & Plastic	128	142	14	14	\$15.93
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	355	348	(7)	13	\$15.04
51-9123	Painting, Coating, & Decorating Workers	109	110	1	12	\$13.02
51-2031	Engine & Other Machine Assemblers	83	89	6	9	\$17.90
51-4062	Patternmakers, Metal & Plastic	86	75	(10)	9	\$16.97
51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	71	79	8	8	\$15.16
51-9191	Adhesive Bonding Machine Operators & Tenders	58	66	8	8	\$16.04
51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	56	64	7	8	\$14.68
51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	189	240	51	6	\$16.27
51-2023	Electromechanical Equipment Assemblers	119	115	(4)	5	\$13.73
51-4081	Multiple Machine Tool Setters, Operators, & Tenders, Metal & Plastic	114	137	22	5	\$14.71
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	143	139	(5)	5	\$14.95
51-4034	Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal & Plastic	136	123	(13)	4	\$14.47
51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	116	107	(8)	4	\$14.66
51-4023	Rolling Machine Setters, Operators, & Tenders, Metal & Plastic	101	92	(9)	3	\$14.05
51-4032	Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal & Plastic	80	72	(7)	3	\$13.49
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	53	65	13	2	\$24.45
51-6064	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders	7	16	9	2	\$12.45
51-6063	Textile Knitting & Weaving Machine Setters, Operators, & Tenders	8	15	7	2	\$11.09
51-6062	Textile Cutting Machine Setters, Operators, & Tenders	11	11	0	2	\$11.42
51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	82	80	(2)	1	\$17.83
51-4035	Milling & Planing Machine Setters, Operators, & Tenders, Metal & Plastic	41	38	(2)	1	\$17.38
51-4061	Model Makers, Metal & Plastic	8	8	1	1	\$21.84
51-4022	Forging Machine Setters, Operators, & Tenders, Metal & Plastic	28	27	(1)	1	\$15.90
51-4192	Layout Workers, Metal & Plastic	23	21	(2)	1	\$19.64



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	17	17	1	1	\$16.78
51-6061	Textile Bleaching & Dyeing Machine Operators & Tenders	2	4	1	1	\$12.29
51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	26	19	(7)	0	\$20.57
17-3026	Industrial Engineering Technicians	43	56	13	0	\$29.33
51-2093	Timing Device Assemblers & Adjusters	0	1	0	0	\$14.89
CONSTRUCTION CRAFTS TECHNOLOGY						
47-2061	Construction Laborers	4,611	5,127	516	560	\$14.12
47-2031	Carpenters	3,276	3,218	(58)	308	\$15.27
47-2051	Cement Masons & Concrete Finishers	1,267	1,307	40	150	\$16.31
47-2141	Painters, Construction & Maintenance	1,578	1,491	(87)	134	\$14.67
47-2081	Drywall & Ceiling Tile Installers	771	803	32	81	\$19.30
47-2181	Roofers	630	656	26	75	\$20.18
47-2044	Tile & Marble Setters	475	461	(14)	43	\$16.22
47-2121	Glaziers	272	271	(1)	34	\$17.92
47-2073	Operating Engineers & Other Construction Equipment Operators	1,049	1,228	179	27	\$25.50
47-2131	Insulation Workers, Floor, Ceiling, & Wall	117	135	18	16	\$18.77
47-2041	Carpet Installers	172	154	(18)	14	\$14.59
47-2042	Floor Layers, Except Carpet, Wood, & Hard Tiles	74	72	(2)	7	\$17.21
47-2132	Insulation Workers, Mechanical	45	55	10	7	\$20.07
49-9071	Maintenance & Repair Workers, General	6,052	6,843	791	5	\$17.37
47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	1,672	1,790	119	5	\$26.68
17-3022	Civil Engineering Technicians	220	267	47	2	\$32.03
47-2043	Floor Sanders & Finishers	19	18	(1)	2	\$13.61
47-2053	Terrazzo Workers & Finishers	11	11	(1)	1	\$20.10
47-2142	Paperhangers	11	10	(1)	1	\$12.86



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
47-2211	Sheet Metal Workers	529	600	71	1	\$21.42
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	0	\$28.54
47-4011	Construction & Building Inspectors	232	269	38	0	\$29.46
13-1051	Cost Estimators	918	1,010	92	0	\$29.16
11-9021	Construction Managers	1,233	1,172	(61)	0	\$29.55
25-2032	Career/Technical Education Teachers, Secondary School	271	326	55	0	\$32.98
MARKETING AND DISTRIBUTION						
41-4012	Sales Representatives, Wholesale & Manufacturing, Except Technical & Scientific Products	5,149	5,668	518	335	\$26.04
41-3021	Insurance Sales Agents	1,927	2,035	109	118	\$22.13
41-1011	First-Line Supervisors of Retail Sales Workers	5,956	6,551	595	95	\$15.86
41-1012	First-Line Supervisors of Non-Retail Sales Workers	1,272	1,384	112	81	\$20.13
41-9041	Telemarketers	310	497	187	73	\$11.76
41-4011	Sales Representatives, Wholesale & Manufacturing, Technical & Scientific Products	765	843	78	50	\$31.52
41-9022	Real Estate Sales Agents	1,326	1,373	47	44	\$18.95
13-1023	Purchasing Agents, Except Wholesale, Retail, & Farm Products	682	746	64	40	\$25.73
41-3031	Securities, Commodities, & Financial Services Sales Agents	906	815	(90)	25	\$23.53
41-9091	Door-to-Door Sales Workers, News & Street Vendors, & Related Workers	335	237	(98)	24	\$12.24
41-3011	Advertising Sales Agents	300	271	(29)	15	\$24.91
13-1022	Wholesale & Retail Buyers, Except Farm Products	378	401	23	4	\$22.49
41-9031	Sales Engineers	64	81	17	3	\$42.95
53-3031	Driver/Sales Workers	1,594	1,892	298	2	\$14.66
13-1161	Market Research Analysts & Marketing Specialists	1,200	1,428	228	2	\$25.74
11-2022	Sales Managers	1,779	1,903	124	0	\$41.17
AUTOMOTIVE TECHNOLOGY						
53-7061	Cleaners of Vehicles & Equipment	2,535	2,949	413	440	\$10.97



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
49-3023	Automotive Service Technicians & Mechanics	3,747	4,208	461	241	\$14.22
49-9071	Maintenance & Repair Workers, General	6,052	6,843	791	82	\$17.37
49-3021	Automotive Body & Related Repairers	611	668	57	52	\$16.13
49-3093	Tire Repairers & Changers	560	663	104	49	\$11.22
49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	1,793	2,063	270	27	\$30.26
49-3022	Automotive Glass Installers & Repairers	57	66	9	7	\$13.20
53-6051	Transportation Inspectors	122	134	12	5	\$28.87
49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	98	70	(28)	4	\$13.44
49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment	70	77	7	4	\$27.89
17-3027	Mechanical Engineering Technicians	37	47	10	3	\$28.42
RETAIL STORE OPERATIONS AND MANAGEMENT						
41-1011	First-Line Supervisors of Retail Sales Workers	5,956	6,551	595	469	\$15.86
13-1022	Wholesale & Retail Buyers, Except Farm Products	378	401	23	21	\$22.49
11-1021	General & Operations Managers	7,732	8,817	1,085	7	\$40.76
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	1	\$28.54
OFFICE TECHNOLOGY/OFFICE COMPUTER APPLICATIONS						
43-6014	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	9,044	10,169	1,125	240	\$16.81
43-9061	Office Clerks, General	13,712	15,258	1,547	86	\$14.74
43-4171	Receptionists & Information Clerks	3,623	4,249	626	63	\$13.14
43-9021	Data Entry Keyers	1,301	1,321	20	13	\$14.83
43-6011	Executive Secretaries & Executive Administrative Assistants	1,868	1,954	86	12	\$23.72
43-4071	File Clerks	682	696	14	9	\$12.40
43-9022	Word Processors & Typists	361	345	(16)	8	\$19.27

Source: Emsi program demand gap model.



reported job openings at the associate degree level of education into account and have been adjusted for other programs that train for the occupations related to Manufacturing & Industrial Technology.

In the previous section we considered the occupational gaps within the Manufacturing & Industrial Technology program, for this section we will instead focus on the occupational gaps for the Construction Crafts Technology program. Occupations mapped to the Construction Crafts Technology program has median hourly wages ranging from \$12.86 for paperhangers to \$32.98 for career/technical education teachers, secondary school. There are large number of occupations that have wages ranging from \$15 per hour to \$20 per hour. Occupations with wages above \$20 per hour include roofers, operating engineers & other construction equipment operators, insulation workers, mechanical, and first-line supervisors of construction trades & extraction workers among others. Construction occupations appear to be in demand and the college could choose to align the program with high paying occupations mapped to the program that generally require some degree of specialization. Further research should be done to see how the current curriculum aligns with the current occupation mapping to decide if it is best aligned with the openings to support further program expansion.¹⁰

Using Table 3.3, this step-by-step process of evaluating occupational gaps by their median hourly wage rates can be applied to the other FCC associate degree programs with a significant gap. In general, gaps around occupations with high wages should be considered more noteworthy than gaps around occupations with low wages.

10 As stated in Footnote 8, further research must be conducted before making a final determination. Emsi is available to conduct this research; see your Emsi contact for details.

Also, if the occupational forecasts around a certain gap are not positive, the gap may not be worth further consideration. Keep in mind that there could be other sources of skilled workers filling the gaps, such as unemployed workers or workers from outside the region. See Appendix 5 for a complete list of job projections, and see Appendix 6 for unemployment information by industry and occupation.

While the gaps are important to keep in mind for building or expanding programs, the surpluses are equally important to ensure the college is training students with skills the regional workforce requires. There are zero programs at FCC with a significant surplus. Respiratory Care/Therapy has the largest, with a surplus of 214. Social Sciences, General also has a surplus, with a surplus of 192, followed by Biological and Physical Sciences (and Mathematics), with a surplus of 160.

In order to give more detail about the demand for the program gaps, Table 3.4, on the previous pages, outlines the economic situation for the occupations mapped to the programs with a significant gap.¹¹

ASSOCIATE DEGREE FOR TRANSFER LEVEL ANALYSIS

The analysis in this section evaluates the associate degree level programs at FCC considered transfer track.¹² In other words, a program completer could readily transfer into a similar bachelor's degree level program at another postsecondary educational institution in the state. As a result, in this section, the demand for regional jobs

11 For a full list of occupational outlooks, see Appendix 5.

12 Associate degree for transfer programs determined by FCC.



and job openings considers a program completer with a bachelor's degree level of education. At FCC, there is 21 such associate degree for transfer level programs when classified by TOP codes.

Figure 3.5, on the next page, shows the programs with a significant gap. The Business Administration program has the largest, followed by the Child Development/Early Care & Education and Administration of Justice programs. As shown in Table 3.5, there is a gap of 2,298 average annual job openings in the region for occupations related to the Business Administration program. On average, the college graduates 149 annual completers, and the region's other postsecondary educational institutions graduate another 641 annual completers. These data take annual reported job openings at the associate degree for transfer level of education into account and have been adjusted for other programs that train for the occupations related to Business Administration.

The next step in the analysis is to consider the occupational gaps within the program. Office clerks, general; general & operations managers; and first-line supervisors of office & administrative support workers are the top three occupations mapped to the program with the highest average annual job openings. These three occupations have median hourly wage rates ranging from \$14.74 for office clerks, general and \$40.76 for general & operations managers. Within the program, chief executives have the highest wage rate at \$67.55, but although these are included in the mapping this occupation is typically filled by workers who have started their own business or have many years of experience. There appears to be enough evidence to support a program expansion, considering the large gap.¹³

¹³ As stated in Footnote 8, further research must be conducted before making a final determination. Emsi is available to conduct this research; see your Emsi contact for details.

Using Table 3.3, this step-by-step process of evaluating occupational gaps by their median hourly wage rates can be applied to the other FCC associate degree for transfer programs with a significant gap. In general, gaps around occupations with high wages should be considered more noteworthy than gaps around occupations with low wages. Also, if the occupational forecasts around a certain gap are not positive, the gap may not be worth further consideration. Keep in mind that there could be other sources of skilled workers filling the gaps, such as unemployed workers or workers from outside the region. See Appendix 5 for a complete list of job projections, and see Appendix 6 for unemployment information by industry and occupation.

While the gaps are important to keep in mind for building or expanding programs, the surpluses are equally important to ensure the college is training students with skills the regional workforce requires. The Speech Communication program has the largest, with a surplus of 109.

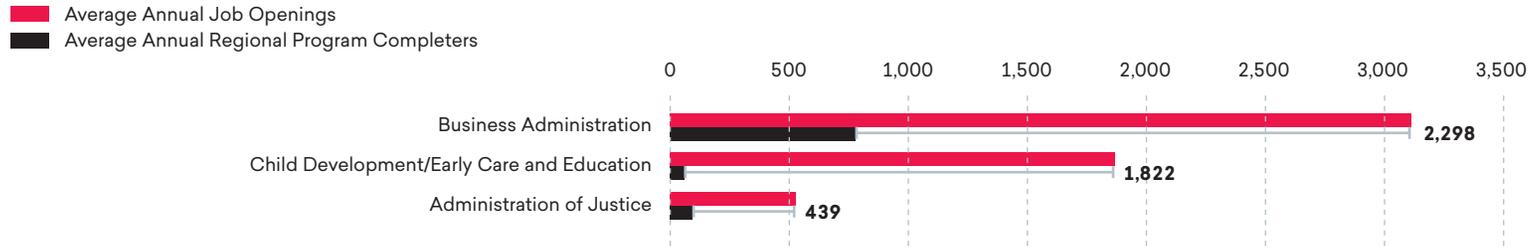
In order to give more detail about the demand for the program gaps, Table 3.5 outlines the economic situation for the occupations mapped to the programs with a significant gap.¹⁴

NON-CREDIT PROGRAM LEVEL ANALYSIS

The results that appear in this section present a view of the non-credit programs projected to have a gap or surplus in the FCC Service Region. The methodology and interpretation for non-credit programs differ somewhat from the certificate and associate degree analyses discussed above. FCC offers 78 non-credit programs,

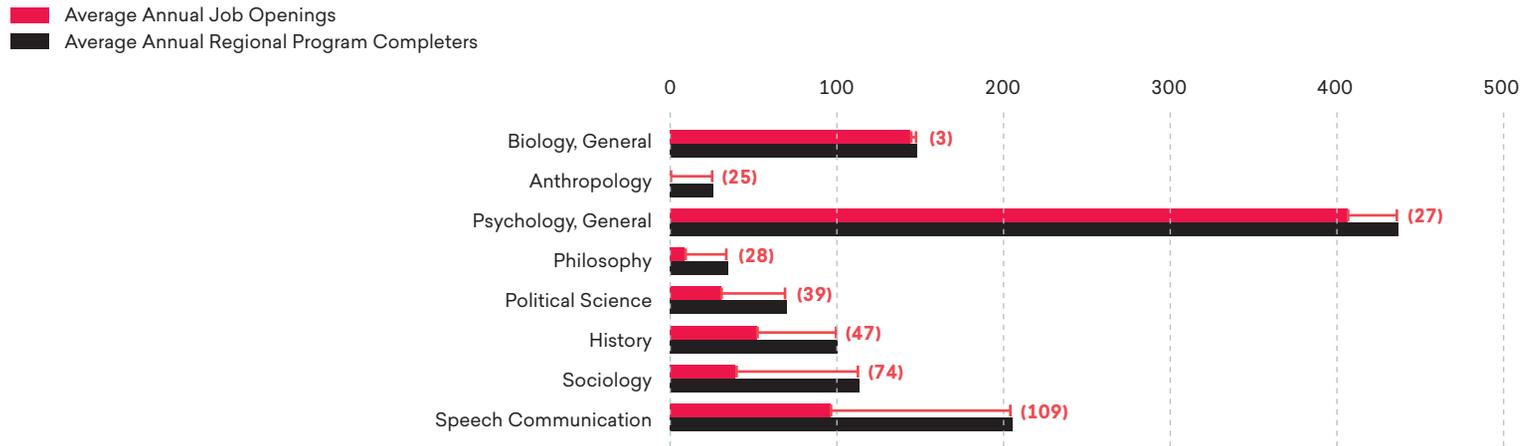
¹⁴ For a full list of occupational outlooks, see Appendix 5.

FIGURE 3.5: Significant Gaps for Associate Degree for Transfer Level Programs at FCC



* The program awards completers with an associate degree, but the demand for jobs in the region considers a bachelor's degree level of education.
Source: Emsi program demand gap model.

FIGURE 3.6: Surpluses for Associate Degree for Transfer Level Programs at FCC



* The program awards completers with an associate degree, but the demand for jobs in the region considers a bachelor's degree level of education.
Source: Emsi program demand gap model.



TABLE 3.4: Supply and Demand for Associate Degree for Transfer Level Programs at FCC

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL COMPLETERS	AVERAGE ANNUAL FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
505.00	Business Administration	3,088	790	149	2,298	\$28.18
1305.00	Child Development/Early Care and Education	1,872	50	50	1,822	\$12.00
2105.00	Administration of Justice	524	85	70	439	\$20.14
1002.00	Art	339	96	19	243	\$24.59
1501.00	English	244	88	24	156	\$27.56
1105.00	Spanish	178	50	8	128	\$27.08
1004.00	Music	134	46	5	88	\$25.65
1914.00	Geology	52	13	1	38	\$23.63
1007.00	Dramatic Arts	60	31	6	29	\$21.63
602.00	Journalism	11	5	5	6	\$25.28
1701.00	Mathematics, General	59	54	17	6	\$34.13
1306.00	Nutrition, Foods, and Culinary Arts	6	2	2	5	\$14.62
1902.00	Physics, General	8	8	2	0	\$39.35
401.00	Biology, General	144	147	47	(3)	\$31.36
2202.00	Anthropology	2	27	9	(25)	\$24.69
2001.00	Psychology, General	411	438	77	(27)	\$23.80
1509.00	Philosophy	7	35	5	(28)	\$34.96
2207.00	Political Science	32	72	6	(39)	\$28.88
2205.00	History	52	99	17	(47)	\$32.49
2208.00	Sociology	39	113	28	(74)	\$31.39
1506.00	Speech Communication	98	207	30	(109)	\$24.59
505.00	Business Administration	3,088	790	149	2,298	\$28.18

* The program awards completers with an associate degree, but the demand for jobs in the region considers a bachelor's degree level of education.

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.



TABLE 3.5: Occupations Related to Significant Gap Programs at the Associate Degree for Transfer Level at FCC

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
BUSINESS ADMINISTRATION						
43-9061	Office Clerks, General	13,712	15,258	1,547	952	\$14.74
11-1021	General & Operations Managers	7,732	8,817	1,085	642	\$40.76
43-1011	First-Line Supervisors of Office & Administrative Support Workers	5,387	6,259	873	363	\$24.32
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	152	\$28.54
43-6011	Executive Secretaries & Executive Administrative Assistants	1,868	1,954	86	138	\$23.72
11-2022	Sales Managers	1,779	1,903	124	133	\$41.17
13-1111	Management Analysts	2,080	2,306	226	132	\$32.57
11-3011	Administrative Services Managers	1,194	1,347	153	96	\$36.91
13-1051	Cost Estimators	918	1,010	92	86	\$29.16
11-9021	Construction Managers	1,233	1,172	(61)	77	\$29.55
11-9199	Managers, All Other	2,483	2,786	303	62	\$20.77
11-1011	Chief Executives	1,080	1,134	54	57	\$67.55
11-9151	Social & Community Service Managers	901	1,148	246	51	\$30.92
11-3071	Transportation, Storage, & Distribution Managers	560	598	38	44	\$36.34
11-3051	Industrial Production Managers	612	672	60	44	\$41.91
15-1199	Computer Occupations, All Other	553	600	47	26	\$34.63
25-1099	Postsecondary Teachers	5,473	6,647	1,174	17	\$35.98
11-3061	Purchasing Managers	194	203	8	13	\$43.22
13-1011	Agents & Business Managers of Artists, Performers, & Athletes	33	32	(1)	3	\$21.52
CHILD DEVELOPMENT/EARLY CARE AND EDUCATION						



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
25-9041	Teacher Assistants	9,108	10,526	1,418	881	\$13.58
39-9011	Childcare Workers	6,080	5,700	(379)	735	\$8.55
21-1093	Social & Human Service Assistants	2,189	2,727	537	197	\$15.47
21-1021	Child, Family, & School Social Workers	1,723	1,969	246	59	\$19.93
ADMINISTRATION OF JUSTICE						
33-9032	Security Guards	3,716	3,674	(43)	327	\$10.86
33-3051	Police & Sheriff's Patrol Officers	2,681	2,907	227	144	\$33.39
33-9021	Private Detectives & Investigators	254	245	(9)	20	\$33.80
33-3021	Detectives & Criminal Investigators	331	368	37	12	\$39.81
25-1099	Postsecondary Teachers	5,473	6,647	1,174	8	\$35.98
33-1012	First-Line Supervisors of Police & Detectives	256	296	40	8	\$72.48
11-9161	Emergency Management Directors	28	33	4	1	\$40.86
33-3052	Transit & Railroad Police	21	23	2	1	\$41.27
33-3011	Bailiffs	6	13	7	1	\$27.88

Source: Emsi program demand gap model.



although these have been grouped together into 22 programs because some train for similar occupations, as seen in Table 3.6, on the next page.

Emsi created a crosswalk between the non-credit programs and the types of occupations non-credit program completers are likely to enter. In general, non-credit programs can be designed for self-enrichment rather than higher education and the development of employable skills. However, FCC confirmed that the non-credit programs they offer are designed with workforce skills in mind. With the customized program-to-occupation mapping, the non-credit programs were analyzed using the program demand gap analysis methods, detailed in Appendix 4.

Several caveats must be kept in mind when interpreting the results of the non-credit program analysis. First, students who take non-credit programs may complete more than one over an academic year since the non-credit courses tend to be much shorter than credit courses. This means that the completions data for the non-credit programs contains duplication, which inflates the number of completers and may cause the non-credit programs to appear to have a large surplus.

Second, the completions can fluctuate annually. Emsi uses a three-year average in the program demand gap analysis to normalize the fluctuations, but it must be recognized that these fluctuations in completions could cause a gap or surplus to vary between years.

Third, completers of non-credit programs may already be employed (i.e., their employer requires continuing education to keep certain licenses up-to-date). It is up to the college to determine whether a program has a gap or surplus that is worth taking action to correct, based on a variety of sources of information beyond the scope of this report.

Fourth, it is important to contrast the results of the credit program analysis with those of the non-credit program analysis. While the non-credit program-to-occupation crosswalk is unique, there are still several shared occupations between completers of credit and non-credit programs. In these instances, completers of both the credit and non-credit programs compete for the same job openings. It is important to compare the results of the credit program demand gap analysis with the supply of completers from the non-credit programs offered in the same fields.

Finally, there may be other institutions or organizations in the region, on-line colleges in particular, that offer non-credit programs not analyzed in this report. The gaps and surpluses shown assume there are no other non-credit programs offered in the region. Figure 3.4 illustrates the non-credit programs with a significant gap.

One program has a significant gap above the 400 job level of significance, as shown in Figure 3.7. The significant gap is for Manufacturing & Industrial Technology, which has a gap of 2,017. As stated previously, the gaps and surpluses take annual reported job openings into account and adjust for those completing a similar program, non-credit or credit, at FCC. Again, data are not publicly available for non-credit programs from other regional institutions and organizations, therefore only FCC non-credit programs are accounted for in this section.

As shown in Table 3.7, the Manufacturing & Industrial Technology non-credit program has the highest gap for FCC. According to Table 3.8, the occupations with the largest projected annual openings are for packaging & filling machine operators & tenders and team assemblers, and food batchmakers. The two occupations have median hourly wage rates of \$12.77 and \$12.54, respectively. Over the next 10 years those top two occupations are expected to add over 1,000 jobs in the FCC Service Region.



TABLE 3.6: Non- Credit Program Mapping

TOP CODE	TITLE	CERTIFICATE TYPE
109.10	Landscape Design and Maintenance	
	Adaptive Ornamental Horticulture	Local Certificate
201.00	Architecture and Architectural Technology	
	Basic Architectural Contract Documents	Local Certificate
	Basic Architectural Design	Local Certificate
	Basic Architectural Office Practice	Local Certificate
	Basic Architectural Skills 1	Local Certificate
	Basic Architectural Skills 2	Local Certificate
	Basic Digital Architecture	Local Certificate
	Computer Aided Drafting and Design - 2D Technician	Local Certificate
	Computer Aided Drafting and Design - Technician I	Local Certificate
502.00	Accounting	
	Accounting - Business Accounting and Finance	Local Certificate
506.00	Business Management	
	Business Administration - Business Law	Local Certificate
	Business Administration - Entrepreneurial Ventures	Local Certificate
	Business Administration - Human Resource Mgmt Assist	Local Certificate
	Business Management - Business Finance & Accounting	Local Certificate
	Business Management - Business Finance & Investments	Local Certificate
	Business Management - Human Relations & Communications	Local Certificate
	Business Management - Human Resources & Relations	Local Certificate
	Business Management - Management & Supervision	Local Certificate
	Business Management - Personal Finance & Investments	Local Certificate
	Business Management - Small Business Management	Local Certificate
	Marketing - Advertising	Local Certificate
	Marketing - Personal Sales	Local Certificate
	Marketing - Retailing	Local Certificate
506.50	Retail Store Operations and Management	
	Fashion Merchandising Certificate	Local Certificate
511.00	Real Estate	
	Real Estate Course Qualification Certificate	Local Certificate
514.00	Office Technology/Office Computer Applications	

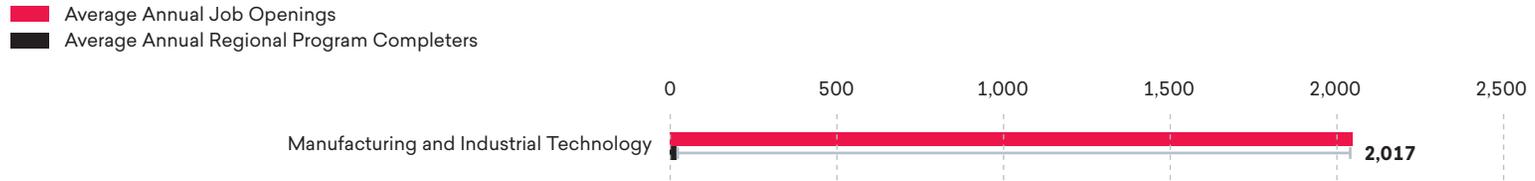
TOP CODE	TITLE	CERTIFICATE TYPE
	Business & Technology - Business Office English	Local Certificate
	Business & Technology - Business Office Math Fundamentals	Local Certificate
	Business & Technology - Computer Application Software	Local Certificate
	Business & Technology - Microsoft Office Foundations	Local Certificate
	Business & Technology - Microsoft Word	Local Certificate
	Business & Technology - Office Assistant Applications	Non-Credit Certificate
	School to Work - Clerical	Local Certificate
	School to Work - Workability	Local Certificate
	High Tech Adaptive Program	Local Certificate
614.00	Digital Media	
	Graphic Communications - Digital Video	Local Certificate
	Graphic Communications - Multimedia	Local Certificate
799.00	Other Information Technology	
	Computer Information Technology - Android App Developer	Local Certificate
	Computer Information Technology - Apple Ios Developer	Local Certificate
	Computer Information Technology - Information Security II	Local Certificate
	Computer Information Technology - MCSE Core	Local Certificate
	Computer Information Technology - Microsoft Excel	Local Certificate
	Computer Information Technology - System Support Spec	Local Certificate
	Computer Information Technology - Webpage Development	Local Certificate
802.00	Educational Aide (Teacher Assistant)	
	Teacher Aide - General	Local Certificate
	Teacher Aide - Special Education	Local Certificate
934.10	Computer Electronics	
	Electrical Systems Technology - Industrial Controls	Local Certificate
	Electrical Systems Technology - Network Security	Local Certificate
946.00	Environmental Control Technology	
	Air Conditioning - Industrial Refrigeration	Local Certificate
948.00	Automotive Technology	
	Automotive Mechanics	Non-Credit Certificate
	Maintenance Mechanic	Non-Credit Certificate
	Automotive Technology - Chassis Technician I	Local Certificate
	Automotive Technology - Chassis Technician II	Local Certificate



TOP CODE	TITLE	CERTIFICATE TYPE
	Automotive Technology - Powertrain Technician II	Local Certificate
949.00	Automotive Collision Repair	
	Automotive Collision Repair	Non-Credit Certificate
	Automotive Collision Repair Technology	Local Certificate
956.00	Manufacturing and Industrial Technology	
	Industrial Training - Industrial Svcs & Warehouse Tech	Non-Credit Certificate
999.00	Other Engineering and Related Industrial Technologies	
	Manufacturing Mechanic	Non-Credit Certificate
1004.00	Music	
	Brass Performance Certificate	Local Certificate
	Music - Jazz Performance Certificate	Local Certificate
	Music - Piano Performance Certificate	Local Certificate
	Music - Vocal Performance	Local Certificate
	Music - Woodwind Performance	Local Certificate
	Music Theory Certificate	Local Certificate
1306.30	Culinary Arts	
	Culinary Arts - Advanced	Local Certificate
	Culinary Arts - Basic	Local Certificate
	Culinary Arts - Intermediate Culinary	Local Certificate
1306.60	Dietetic Technology	
	Food and Nutrition - Dietary Aide	Local Certificate
2104.00	Human Services	
	Human Services - Alcoholism and Drug Abuse Counseling	Local Certificate
2105.10	Corrections	
	AJ Adult Correctional Officer	Local Certificate
	AJ Basic Supervisors	Local Certificate
	AJ Juvenile Correctional Officer	Local Certificate
	AJ Probation Core	Local Certificate
	AJ Public Safety Dispatcher	Local Certificate
	AJ Requalification Basic	Local Certificate
2133.00	Fire Technology	
	Fire Technology - Emergency Medical Technician	Local Certificate
	Fire Technology - EMT Refresher	Local Certificate

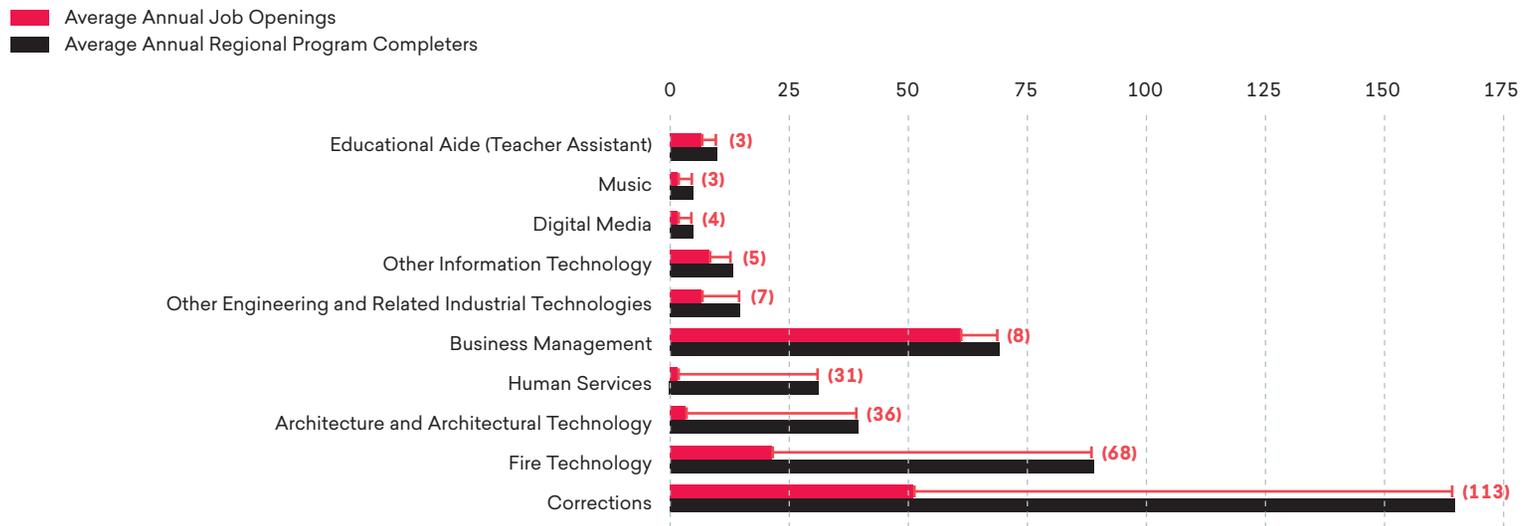


FIGURE 3.7: Significant Gaps for the Non-Credit Programs at FCC



Source: Emsi program demand gap model.

FIGURE 3.8: Largest Surpluses for the Non-Credit Programs at FCC



Source: Emsi program demand gap model.



TABLE 3.7: Supply and Demand for Non-Credit Programs at FCC

TOP CODE	TOP TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL FCC COMPLETERS	GAP OR SURPLUS	MEDIAN HOURLY WAGE
956.00	Manufacturing and Industrial Technology	2,039	22	2,017	\$12.76
514.00	Office Technology/Office Computer Applications	206	76	130	\$15.69
1306.30	Culinary Arts	138	19	119	\$13.17
948.00	Automotive Technology	153	42	111	\$14.78
949.00	Automotive Collision Repair	136	28	108	\$15.80
109.10	Landscape Design and Maintenance	43	10	33	\$12.98
506.50	Retail Store Operations and Management	15	1	14	\$15.48
511.00	Real Estate	5	1	4	\$18.95
502.00	Accounting	1	1	0	\$18.99
946.00	Environmental Control Technology	1	1	0	\$17.47
934.10	Computer Electronics	2	4	(2)	\$20.64
1306.60	Dietetic Technology	0	2	(2)	\$11.82
802.00	Educational Aide (Teacher Assistant)	7	10	(3)	\$13.58
1004.00	Music	2	5	(3)	\$20.40
614.00	Digital Media	1	5	(4)	\$19.87
799.00	Other Information Technology	8	13	(5)	\$24.05
999.00	Other Engineering and Related Industrial Technologies	7	14	(7)	\$18.48
506.00	Business Management	61	69	(8)	\$18.50
2104.00	Human Services	1	31	(31)	\$17.75
201.00	Architecture and Architectural Technology	4	40	(36)	\$24.24
2133.00	Fire Technology	21	89	(68)	\$30.66
2105.10	Corrections	51	164	(113)	\$28.99

Numbers may not sum due to rounding. Annual completers represent an average across the past three years. Source: Emsi

program demand gap model. Source: Emsi gap model.



TABLE 3.8: Occupations Related to Significant Gap Programs at the Non-Credit Level at FCC

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
MANUFACTURING AND INDUSTRIAL TECHNOLOGY						
51-9111	Packaging & Filling Machine Operators & Tenders	4,411	5,032	620	603	\$12.77
51-2092	Team Assemblers	2,695	3,097	402	357	\$12.54
51-3092	Food Batchmakers	1,908	2,056	147	262	\$14.75
51-1011	First-Line Supervisors of Production & Operating Workers	2,422	2,681	259	221	\$23.15
51-9023	Mixing & Blending Machine Setters, Operators, & Tenders	766	840	74	93	\$17.50
51-9012	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	867	932	64	74	\$19.12
51-3093	Food Cooking Machine Operators & Tenders	461	530	69	71	\$12.49
51-9196	Paper Goods Machine Setters, Operators, & Tenders	517	604	87	64	\$16.53
51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	465	492	28	57	\$14.26
51-9192	Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders	365	413	48	52	\$11.87
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	2,026	2,292	266	50	\$14.10
51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	435	477	42	50	\$10.85
53-7011	Conveyor Operators & Tenders	161	190	30	26	\$13.27
51-2022	Electrical & Electronic Equipment Assemblers	541	591	50	25	\$13.17
51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	153	183	31	22	\$12.38
51-9121	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	183	206	23	22	\$15.05
51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	149	185	37	22	\$11.02
51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	181	195	14	22	\$16.99
51-9041	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	152	168	16	21	\$12.93
51-4072	Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	182	171	(11)	19	\$13.43
51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	172	146	(26)	16	\$12.83
51-9193	Cooling & Freezing Equipment Operators & Tenders	106	118	12	13	\$13.99
51-9195	Molders, Shapers, & Casters, Except Metal & Plastic	128	142	14	13	\$15.93
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	355	348	(7)	12	\$15.04
51-9123	Painting, Coating, & Decorating Workers	109	110	1	12	\$13.02



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	JOB CHANGE	AVERAGE ANNUAL JOB OPENINGS	MEDIAN HOURLY WAGE
51-2031	Engine & Other Machine Assemblers	83	89	6	9	\$17.90
51-4062	Patternmakers, Metal & Plastic	86	75	(10)	8	\$16.97
51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	71	79	8	8	\$15.16
51-9191	Adhesive Bonding Machine Operators & Tenders	58	66	8	8	\$16.04
51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	56	64	7	7	\$14.68
51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	189	240	51	5	\$16.27
51-2023	Electromechanical Equipment Assemblers	119	115	(4)	5	\$13.73
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	143	139	(5)	5	\$14.95
51-4081	Multiple Machine Tool Setters, Operators, & Tenders, Metal & Plastic	114	137	22	5	\$14.71
51-4034	Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal & Plastic	136	123	(13)	4	\$14.47
51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	116	107	(8)	3	\$14.66
51-4023	Rolling Machine Setters, Operators, & Tenders, Metal & Plastic	101	92	(9)	3	\$14.05
51-4032	Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal & Plastic	80	72	(7)	2	\$13.49
51-6064	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders	7	16	9	2	\$12.45
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	53	65	13	2	\$24.45
51-6063	Textile Knitting & Weaving Machine Setters, Operators, & Tenders	8	15	7	2	\$11.09
51-6062	Textile Cutting Machine Setters, Operators, & Tenders	11	11	0	2	\$11.42
51-4035	Milling & Planing Machine Setters, Operators, & Tenders, Metal & Plastic	41	38	(2)	1	\$17.38
51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	82	80	(2)	1	\$17.83
51-4061	Model Makers, Metal & Plastic	8	8	1	1	\$21.84
51-4022	Forging Machine Setters, Operators, & Tenders, Metal & Plastic	28	27	(1)	1	\$15.90
51-4192	Layout Workers, Metal & Plastic	23	21	(2)	1	\$19.64
51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	17	17	1	1	\$16.78
51-6061	Textile Bleaching & Dyeing Machine Operators & Tenders	2	4	1	1	\$12.29
51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	26	19	(7)	0	\$20.57
17-3026	Industrial Engineering Technicians	43	56	13	0	\$29.33
51-2093	Timing Device Assemblers & Adjusters	0	1	0	0	\$14.89

Source: Emsi program demand gap model.



LIBERAL ARTS AND GENERAL STUDIES STUDENTS

A number of students attend FCC with the intention of transferring to a four-year school to receive a bachelor's degree. Although these students study any number of topics, a large number of them receive associate of arts degrees in general studies. Over the past four years, an average of 56 students have completed liberal arts or general studies degree at the associate degree level, which composes 2% of the college's annual production of certificates and degrees.

Once these students leave FCC, their educational and career track is difficult to predict. They could attend a four-year college in the region or outside the region, and they could study any number of different programs that will ultimately determine their future career. What can be shown is that over the next 10 years, jobs that require a bachelor's degree are projected to be in high demand. In any given year between 2017 and 2027, 101,307 jobs will require a bachelor's degree and 333,933 will require a bachelor's degree or less, availing these students of 73% of all regional job openings.

SUMMARY

Across the certificate, associate degree, associate degree for transfer, and non-credit program levels, there are a total of 17 programs associated with significant workforce gaps.

There are seven certificate level programs with significant gaps. Manufacturing & Industrial Technology has the largest certificate level gap in the FCC Service Region (gap of 2,274; median hourly wage \$14.67). Business Administration (gap of 1,655; median hourly wage \$26.40) and Construction Crafts Technology (gap of 1,408; median hourly wage \$15.78) are the second and third largest gaps at the certificate level in the FCC Service Region. There are six associate degree level programs that also registered a gap. The top three are Manufacturing & Industrial Technology (gap of 2,458; median hourly wage \$14.73), Construction Crafts Technology (gap of 1,471; median hourly wage \$15.78), and Marketing & Distribution (gap of 908; median hourly wage \$22.3). There are three associate degree for transfer level programs that also registered a gap. They are Business Administration (gap of 2,298; median hourly wage \$28.18), Child Development/Early Care & Education (gap of 1,822; median hourly wage \$12.00), and Administration of Justice (gap of 439; median hourly wage \$20.14). There is one non-credit level program that also registered a gap. It is Manufacturing & Industrial Technology (gap of 2,017; median hourly wage \$12.76).

There is one program associated with a significant workforce surplus. It is Medical Assisting (gap of 764; median hourly wage \$15.09) at the certificate level. Some of the completers are likely getting jobs outside the FCC Service Region.



CHAPTER 4:

NEW PROGRAM ADDITIONS

Thus far, the analysis has centered around programs offered by FCC. This chapter looks at workforce gaps that exist within occupations that FCC does not currently train for and provides new program recommendations. Please note that these recommendations are based solely on the gap and whether or not the occupation looks promising (job growth, wages, etc.). These are initial findings and should serve as a starting point for further research. The college will still need to undergo steps before deciding whether or not these programs would be a good fit for the college and the region. This future work could include surveying local employers, analyzing skills and similar programs offered elsewhere, calculating program specific economic impacts, and looking at capacity and capital requirements for building these programs.

The tables below contain lists of programmatic areas of opportunity that could fill gaps in the labor market at each respective award level. These selected occupations present unmet annual job openings within the region. Please note that these tables highlight particular occupations, and in many cases a program can be designed to train for multiple occupations. Once these occupations are grouped with other similar occupations, the actual workforce gap may be larger. Therefore, several occupations with relatively small gaps are

included. The occupations are placed into a recommended level of education for the program; this is a mere suggestion of what credential level the potential program could be offered at based on the education required to perform in the occupation. Again, it is up to the college to determine what degree level each potential program should be offered, based on all capacity and capital requirements for building new programs.

ADDITIONS AT THE CERTIFICATE LEVEL

As seen in Table 4.1, on the next page, there are a number of potential programs at the certificate level. Heavy & tractor-trailer truck drivers is the largest, although it should be noted that some institutions that do not report to IPEDs may train for this occupation so the supply figure may be under reported. There are a number of supervisory occupations so curriculum that gives students management skills may be valuable. Wage rates range between \$15.27 per hour for customer service representatives to \$25.29 per hour for electricians. Most occupations require a certificate level of education or lower, but creating an associate degree program may capture more of the regional demand for these occupations and make completers more competitive in the labor market.

TABLE 4.1: Programmatic Areas of Opportunity at the Certificate Level for FCC

SOC CODE	SOC TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL REGIONAL COMPLETERS	GAP	MEDIAN HOURLY WAGE
53-3032	Heavy & Tractor-Trailer Truck Drivers	1,280	102	1,177	\$19.06
43-4051	Customer Service Representatives	829	13	816	\$15.27
45-1011	First-Line Supervisors of Farming, Fishing, & Forestry Workers	302	5	297	\$15.48
53-3022	Bus Drivers, School or Special Client	251	24	227	\$16.32
47-2111	Electricians	237	9	227	\$25.29
29-2061	Licensed Practical & Licensed Vocational Nurses	247	34	212	\$23.64
49-2022	Telecommunications Equipment Installers & Repairers, Except Line Installers	118	6	112	\$24.44
37-1011	First-Line Supervisors of Housekeeping & Janitorial Workers	102	0	102	\$16.91
43-4199	Information & Record Clerks, All Other	101	0	101	\$17.13
49-3031	Bus & Truck Mechanics & Diesel Engine Specialists	98	0	98	\$19.61
31-9091	Dental Assistants	195	98	98	\$15.50
51-4041	Machinists	105	20	85	\$18.02
43-5032	Dispatchers, Except Police, Fire, & Ambulance	85	1	84	\$17.19
53-1021	First-Line Supervisors of Helpers, Laborers, & Material Movers, & Hand	83	0	83	\$23.15
43-4151	Order Clerks	83	2	81	\$16.02
31-9099	Healthcare Support Workers, All Other	79	1	78	\$20.72
43-4111	Interviewers, Except Eligibility & Loan	71	0	71	\$16.52
43-3011	Bill & Account Collectors	69	0	69	\$17.29
37-2021	Pest Control Workers	66	0	66	\$15.96
29-2052	Pharmacy Technicians	94	29	65	\$17.00
31-9097	Phlebotomists	64	1	63	\$17.52

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.



ADDITIONS AT THE ASSOCIATE DEGREE LEVEL

As seen in Table 4.2, there are many medical occupations that have workforce gaps, although none of them are significant. Some of these gaps currently have completions from other regional institutions, while some are not currently being trained for. Wage rates range between \$14.38 per hour for physical therapist aides to \$41.06 per hour for nuclear medicine technologists.

ADDITIONS AT THE ASSOCIATE DEGREE FOR TRANSFER LEVEL

As seen in Table 4.3, on the next page, there are a number of Occupations that appear to be undersupplied in the FCC Service Region. The gaps are across a range of occupations in the education, business, and medical categories. Business occupations occur frequently as potential new programs, although the college already has a business program so these are occupations that do not appear in

TABLE 4.2: Programmatic Areas of Opportunity at the Associate Degree Level for FCC

SOC CODE	SOC TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL REGIONAL COMPLETERS	GAP	MEDIAN HOURLY WAGE
31-2022	Physical Therapist Aides	38	12	26	\$14.38
29-2032	Diagnostic Medical Sonographers	17	0	17	\$38.07
29-2031	Cardiovascular Technologists & Technicians	15	0	15	\$32.14
31-2021	Physical Therapist Assistants	25	11	14	\$30.07
31-2011	Occupational Therapy Assistants	12	0	12	\$32.30
29-2035	Magnetic Resonance Imaging Technologists	7	0	7	\$34.11
39-4031	Morticians, Undertakers, & Funeral Directors	5	0	5	\$22.18
31-2012	Occupational Therapy Aides	4	0	4	\$15.41
29-2033	Nuclear Medicine Technologists	4	0	4	\$41.06

Numbers may not sum due to rounding. Annual completers represent an average across the past three years.

Source: Emsi program demand gap model.



TABLE 4.3: Programmatic Areas of Opportunity at the Associate Degree for Transfer Level for FCC

SOC CODE	SOC TITLE	AVERAGE ANNUAL JOB OPENINGS	AVERAGE ANNUAL REGIONAL COMPLETERS	GAP	MEDIAN HOURLY WAGE
25-3098	Substitute Teachers	643	0	643	\$17.69
41-3099	Sales Representatives, Services, All Other	403	2	402	\$21.68
13-1071	Human Resources Specialists	138	22	117	\$27.83
25-2012	Kindergarten Teachers, Except Special Education	111	3	108	\$30.48
11-3031	Financial Managers	107	1	106	\$43.61
39-9031	Fitness Trainers & Aerobics Instructors	159	54	105	\$22.48
13-2081	Tax Examiners & Collectors, & Revenue Agents	100	0	100	\$21.79
13-1031	Claims Adjusters, Examiners, & Investigators	100	0	100	\$31.35
45-2011	Agricultural Inspectors	100	2	98	\$21.60
21-1029	Social Workers, All Other	102	4	98	\$23.34
13-1151	Training & Development Specialists	73	0	73	\$26.13
41-9099	Sales & Related Workers, All Other	65	0	65	\$19.69
13-2072	Loan Officer's	60	0	60	\$33.36
21-2021	Directors, Religious Activities & Education	58	1	57	\$16.51
19-4093	Forest & Conservation Technicians	49	0	49	\$15.28
29-2012	Medical & Clinical Laboratory Technicians	47	4	43	\$22.41
11-3121	Human Resources Managers	38	0	37	\$43.76
29-2011	Medical & Clinical Laboratory Technologists	39	3	36	\$40.30
13-1081	Logisticians	36	0	35	\$33.44
43-3061	Procurement Clerks	32	0	32	\$18.73

Numbers may not sum due to rounding. Annual completers represent an average across the past three years. Source: Emsi program demand gap model.

the current mapping. It should be noted that examining the gaps to align your curriculum with these occupations will help graduates be aligned with regional business needs. Wage rates range between \$15.28 per hour for forest & conservation technicians to \$43.76 per hour for human resources managers.

SUMMARY

There are 50 certificate, associate, and associate degree for transfer level programmatic areas of opportunity that have been identified, many of which are related to business, education, and healthcare.

Some of the suggested potential new programs are related to current programs, indicating that there may be an opportunity to adjust current programming to align with the labor market demand. Many of these suggested occupations require a certificate level of education or lower, but more of the regional labor market demand may be captured by developing an associate degree program around some of these occupations, and completers of an associate degree program will be more competitive in the labor market. Additionally, there is ample demand for bachelor's degree completers which can be served through FCC's associate degree for transfer programs.

APPENDIX 1: ABOUT EMSI DATA

Emsi data were used to calculate the projected number of annual job openings from 2017 to 2027. These projections take into account openings due to job growth and openings due to replacement needs, such as when a worker retires or leaves the position.

In order to capture a complete picture of industry employment, Emsi gathers and integrates economic, labor market, demographic, and education data from over 40 government and private-sector sources, creating a comprehensive and current database that includes both published data and detailed estimates with full coverage of the United States.

More specifically, Emsi combines covered employment data from Quarterly Census of Employment and Wages (QCEW-produced by the Department of Labor) with total employment data in Regional

Economic Information System (REIS-published by the Bureau of Economic Analysis or BEA). This is augmented with County Business Patterns (CBP) and Non-Employer Statistics (NES) published by the Census Bureau. Projections are based on the latest-available Emsi industry data, 15-year past local trends in each industry, growth rates in statewide and, where available, sub-state area industry projections published by individual state agencies and, in part, growth rates in national projections from the Bureau of Labor Statistics (BLS).

Through this combination of data sources, Emsi is able to fill gaps in individual sources (such as suppressions), yielding a composite database that leverages the strengths of all its sources. Finally, Emsi's database is updated quarterly, providing the most up-to-date integrated information possible.



APPENDIX 2: ECONOMIC OVERVIEW TABLES

In Chapter 2, we provided a high-level overview with figures of the FCC Service Region. This appendix holds the supporting data tables.

INDUSTRY COMPOSITION

TABLE A2.1: Current and Projected Jobs by Industry Subsector in the FCC Service Region, 2017 and 2027

NAICS CODE	NAICS TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE
111	Crop Production	27,502	20,963	(6,538)	(24%)
112	Animal Production & Aquaculture	13,794	13,332	(462)	(3%)
113	Forestry & Logging	177	139	(38)	(22%)
114	Fishing, Hunting & Trapping	13	13	(0)	(1%)
115	Support Activities for Agriculture & Forestry	69,123	78,439	9,316	13%
211	Oil & Gas Extraction	98	148	50	52%
212	Mining (except Oil & Gas)	245	346	101	41%
213	Support Activities for Mining	65	78	14	21%
221	Utilities	3,362	4,581	1,219	36%
236	Construction of Buildings	6,847	6,771	(76)	(1%)
237	Heavy & Civil Engineering Construction	3,329	3,939	610	18%
238	Specialty Trade Contractors	20,575	22,558	1,983	10%
311	Food Manufacturing	24,952	27,517	2,565	10%
312	Beverage & Tobacco Product Manufacturing	1,882	2,075	193	10%
313	Textile Mills	180	243	64	35%
314	Textile Product Mills	129	95	(34)	(26%)
315	Apparel Manufacturing	86	64	(22)	(25%)
316	Leather & Allied Product Manufacturing	6	6	(0)	(4%)

NAICS CODE	NAICS TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE
321	Wood Product Manufacturing	1,578	1,894	317	20%
322	Paper Manufacturing	2,155	2,534	379	18%
323	Printing & Related Support Activities	985	723	(262)	(27%)
324	Petroleum & Coal Products Manufacturing	28	2	(26)	(92%)
325	Chemical Manufacturing	861	1,029	168	20%
326	Plastics & Rubber Products Manufacturing	1,861	1,945	84	5%
327	Nonmetallic Mineral Product Manufacturing	1,714	1,876	162	9%
331	Primary Metal Manufacturing	293	216	(77)	(26%)
332	Fabricated Metal Product Manufacturing	2,857	3,166	309	11%
333	Machinery Manufacturing	3,377	3,476	99	3%
334	Computer & Electronic Product Manufacturing	1,245	1,057	(188)	(15%)
335	Electrical Equipment, Appliance, & Component Manufacturing	172	193	21	12%
336	Transportation Equipment Manufacturing	1,030	1,209	178	17%
337	Furniture & Related Product Manufacturing	573	594	20	4%
339	Miscellaneous Manufacturing	1,052	967	(85)	(8%)
423	Merchant Wholesalers, Durable Goods	8,057	9,002	945	12%
424	Merchant Wholesalers, Nondurable Goods	10,983	12,705	1,722	16%
425	Wholesale Electronic Markets & Agents & Brokers	1,362	1,331	(31)	(2%)
441	Motor Vehicle & Parts Dealers	8,736	9,818	1,081	12%
442	Furniture & Home Furnishings Stores	1,617	1,551	(67)	(4%)
443	Electronics & Appliance Stores	2,589	3,076	487	19%
444	Building Material & Garden Equipment & Supplies Dealers	5,157	5,472	315	6%
445	Food & Beverage Stores	13,685	15,699	2,015	15%
446	Health & Personal Care Stores	4,478	4,815	337	8%
447	Gasoline Stations	2,732	2,871	139	5%
448	Clothing & Clothing Accessories Stores	6,117	7,306	1,189	19%
451	Sporting Goods, Hobby, Musical Instrument, & Book Stores	3,170	4,169	999	32%



NAICS CODE	NAICS TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE
452	General Merchandise Stores	14,046	15,929	1,883	13%
453	Miscellaneous Store Retailers	3,205	2,938	(267)	(8%)
454	Nonstore Retailers	1,283	1,207	(76)	(6%)
481	Air Transportation	525	451	(75)	(14%)
482	Rail Transportation	471	453	(18)	(4%)
483	Water Transportation	28	46	18	66%
484	Truck Transportation	9,909	11,380	1,471	15%
485	Transit & Ground Passenger Transportation	1,626	2,137	511	31%
486	Pipeline Transportation	42	50	8	20%
487	Scenic & Sightseeing Transportation	96	144	47	49%
488	Support Activities for Transportation	1,922	2,094	172	9%
491	Postal Service	11	14	3	28%
492	Couriers & Messengers	2,050	2,300	250	12%
493	Warehousing & Storage	4,134	4,437	303	7%
511	Publishing Industries (except Internet)	914	947	33	4%
512	Motion Picture & Sound Recording Industries	764	873	109	14%
515	Broadcasting (except Internet)	1,649	1,708	58	4%
517	Telecommunications	1,920	2,456	535	28%
518	Data Processing, Hosting, & Related Services	189	219	29	16%
519	Other Information Services	113	144	31	27%
521	Monetary Authorities-Central Bank	0	0	0	--
522	Credit Intermediation & Related Activities	5,375	4,676	(699)	(13%)
523	Securities, Commodity Contracts, & Other Financial Investments & Related Activities	895	875	(20)	(2%)
524	Insurance Carriers & Related Activities	7,353	8,006	652	9%
525	Funds, Trusts, & Other Financial Vehicles	41	53	12	30%
531	Real Estate	6,850	7,418	568	8%

NAICS CODE	NAICS TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE
532	Rental & Leasing Services	1,779	1,988	209	12%
533	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	136	235	99	73%
541	Professional, Scientific, & Technical Services	18,147	19,502	1,355	7%
551	Management of Companies & Enterprises	3,257	2,304	(953)	(29%)
561	Administrative & Support Services	33,096	39,390	6,295	19%
562	Waste Management & Remediation Services	1,983	2,446	463	23%
611	Educational Services	9,001	10,327	1,326	15%
621	Ambulatory Health Care Services	27,419	36,279	8,860	32%
622	Hospitals	19,206	22,703	3,497	18%
623	Nursing & Residential Care Facilities	12,064	14,734	2,670	22%
624	Social Assistance	34,257	44,817	10,559	31%
711	Performing Arts, Spectator Sports, & Related Industries	1,503	1,498	(5)	(0%)
712	Museums, Historical Sites, & Similar Institutions	430	522	92	21%
713	Amusement, Gambling, & Recreation Industries	4,271	4,827	556	13%
721	Accommodation	3,597	4,004	407	11%
722	Food Services & Drinking Places	43,643	50,216	6,574	15%
811	Repair & Maintenance	8,782	10,247	1,465	17%
812	Personal & Laundry Services	7,465	8,627	1,162	16%
813	Religious, Grantmaking, Civic, Professional, & Similar Organizations	9,955	10,266	311	3%
814	Private Households	1,956	444	(1,512)	(77%)
901	Federal Government	20,442	19,346	(1,096)	(5%)
902	State Government	22,128	26,902	4,774	22%
903	Local Government	95,329	106,995	11,667	12%
Total		706,083	789,575	83,492	9%

Source: Emsi Employees & Self-Employed 2018.1.



TABLE A2.2: Employment Concentration (LQ) by Industry Subsector in the FCC Service Region, 2017 and 2027

NAICS CODE	NAICS TITLE	2017 LQ	2027 LQ
111	Crop Production	7.50	5.70
112	Animal Production & Aquaculture	7.22	7.09
113	Forestry & Logging	0.51	0.41
114	Fishing, Hunting & Trapping	0.08	0.08
115	Support Activities for Agriculture & Forestry	28.21	27.27
211	Oil & Gas Extraction	0.14	0.19
212	Mining (except Oil & Gas)	0.30	0.41
213	Support Activities for Mining	0.05	0.06
221	Utilities	1.36	1.77
236	Construction of Buildings	0.76	0.69
237	Heavy & Civil Engineering Construction	0.73	0.71
238	Specialty Trade Contractors	0.82	0.81
311	Food Manufacturing	3.54	3.60
312	Beverage & Tobacco Product Manufacturing	1.64	1.55
313	Textile Mills	0.35	0.55
314	Textile Product Mills	0.23	0.19
315	Apparel Manufacturing	0.14	0.15
316	Leather & Allied Product Manufacturing	0.04	0.05
321	Wood Product Manufacturing	0.86	0.97
322	Paper Manufacturing	1.32	1.61
323	Printing & Related Support Activities	0.48	0.40
324	Petroleum & Coal Products Manufacturing	0.06	0.00
325	Chemical Manufacturing	0.24	0.27

NAICS CODE	NAICS TITLE	2017 LQ	2027 LQ
326	Plastics & Rubber Products Manufacturing	0.59	0.62
327	Nonmetallic Mineral Product Manufacturing	0.92	0.98
331	Primary Metal Manufacturing	0.18	0.13
332	Fabricated Metal Product Manufacturing	0.45	0.47
333	Machinery Manufacturing	0.71	0.70
334	Computer & Electronic Product Manufacturing	0.27	0.23
335	Electrical Equipment, Appliance, & Component Manufacturing	0.10	0.11
336	Transportation Equipment Manufacturing	0.14	0.16
337	Furniture & Related Product Manufacturing	0.31	0.31
339	Miscellaneous Manufacturing	0.37	0.33
423	Merchant Wholesalers, Durable Goods	0.60	0.62
424	Merchant Wholesalers, Nondurable Goods	1.18	1.27
425	Wholesale Electronic Markets & Agents & Brokers	0.34	0.27
441	Motor Vehicle & Parts Dealers	0.96	0.96
442	Furniture & Home Furnishings Stores	0.73	0.70
443	Electronics & Appliance Stores	1.10	1.33
444	Building Material & Garden Equipment & Supplies Dealers	0.89	0.86
445	Food & Beverage Stores	0.98	1.03
446	Health & Personal Care Stores	0.92	0.91
447	Gasoline Stations	0.66	0.63
448	Clothing & Clothing Accessories Stores	0.96	1.10
451	Sporting Goods, Hobby, Musical Instrument, & Book Stores	1.11	1.28
452	General Merchandise Stores	0.99	1.00
453	Miscellaneous Store Retailers	0.75	0.67



NAICS CODE	NAICS TITLE	2017 LQ	2027 LQ
454	Nonstore Retailers	0.42	0.32
481	Air Transportation	0.24	0.20
482	Rail Transportation	0.48	0.43
483	Water Transportation	0.09	0.13
484	Truck Transportation	1.35	1.43
485	Transit & Ground Passenger Transportation	0.59	0.66
486	Pipeline Transportation	0.19	0.20
487	Scenic & Sightseeing Transportation	0.59	0.75
488	Support Activities for Transportation	0.60	0.56
491	Postal Service	0.21	0.17
492	Couriers & Messengers	0.67	0.70
493	Warehousing & Storage	0.96	0.86
511	Publishing Industries (except Internet)	0.27	0.27
512	Motion Picture & Sound Recording Industries	0.34	0.33
515	Broadcasting (except Internet)	1.32	1.35
517	Telecommunications	0.53	0.70
518	Data Processing, Hosting, & Related Services	0.14	0.14
519	Other Information Services	0.09	0.09
521	Monetary Authorities-Central Bank	0.00	0.00
522	Credit Intermediation & Related Activities	0.46	0.37
523	Securities, Commodity Contracts, & Other Financial Investments & Related Activities	0.20	0.16
524	Insurance Carriers & Related Activities	0.66	0.64
525	Funds, Trusts, & Other Financial Vehicles	0.82	0.90
531	Real Estate	0.75	0.74



NAICS CODE	NAICS TITLE	2017 LQ	2027 LQ
532	Rental & Leasing Services	0.71	0.71
533	Lessors of Nonfinancial Intangible Assets (except Copyrighted Works)	1.27	2.03
541	Professional, Scientific, & Technical Services	0.40	0.37
551	Management of Companies & Enterprises	0.33	0.21
561	Administrative & Support Services	0.78	0.81
562	Waste Management & Remediation Services	1.05	1.13
611	Educational Services	0.49	0.48
621	Ambulatory Health Care Services	0.82	0.82
622	Hospitals	0.87	0.91
623	Nursing & Residential Care Facilities	0.81	0.81
624	Social Assistance	1.82	2.04
711	Performing Arts, Spectator Sports, & Related Industries	0.41	0.36
712	Museums, Historical Sites, & Similar Institutions	0.58	0.60
713	Amusement, Gambling, & Recreation Industries	0.55	0.54
721	Accommodation	0.41	0.41
722	Food Services & Drinking Places	0.84	0.85
811	Repair & Maintenance	1.18	1.24
812	Personal & Laundry Services	0.78	0.80
813	Religious, Grantmaking, Civic, Professional, & Similar Organizations	0.77	0.72
814	Private Households	0.49	0.10
901	Federal Government	0.94	0.89
902	State Government	0.93	1.05
903	Local Government	1.51	1.55

Source: Emsi Employees & Self-Employed 2018.1.



INDUSTRY STAFFING PATTERNS

TABLE A2.3: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Support Activities for Agriculture & Forestry

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
45-2092	Farmworkers, and Laborers, Crop, Nursery, and Greenhouse	52,716	58,462	5,746	11%	74.9%
45-2041	Graders and Sorters, Agricultural Products	2,226	2,528	302	14%	3.2%
45-2091	Agricultural Equipment Operators	1,619	2,213	594	37%	2.3%
53-7064	Packers and Packagers, Hand	1,603	1,998	395	25%	2.3%
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	1,538	1,685	147	10%	2.2%
51-9111	Packaging and Filling Machine Operators and Tenders	1,047	1,285	238	23%	1.5%
53-7051	Industrial Truck and Tractor Operators	677	839	162	24%	1.0%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	649	823	174	27%	0.9%
39-2021	Nonfarm Animal Caretakers	546	551	5	1%	0.8%
11-9013	Farmers, Ranchers, and Other Agricultural Managers	521	498	(23)	(4%)	0.7%
43-9061	Office Clerks, General	458	565	107	23%	0.7%
53-3032	Heavy and Tractor-Trailer Truck Drivers	428	551	123	29%	0.6%
51-9198	Helpers--Production Workers	395	475	80	20%	0.6%
39-2011	Animal Trainers	379	323	(56)	(15%)	0.5%
11-1021	General and Operations Managers	305	377	72	24%	0.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	289	347	58	20%	0.4%
49-3041	Farm Equipment Mechanics and Service Technicians	269	325	56	21%	0.4%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	224	279	55	25%	0.3%
49-9071	Maintenance and Repair Workers, General	218	273	55	25%	0.3%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	206	250	44	21%	0.3%
45-2011	Agricultural Inspectors	204	236	32	16%	0.3%
43-5071	Shipping, Receiving, and Traffic Clerks	194	230	36	19%	0.3%
45-2093	Farmworkers, Farm, Ranch, and Agricultural Animals	184	227	43	23%	0.3%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	179	227	48	27%	0.3%
51-9192	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	143	176	33	23%	0.2%

Source: Emsi Employees & Self-Employed 2018.1.



INDUSTRY STAFFING PATTERNS

TABLE A2.3: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Support Activities for Agriculture & Forestry

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
45-2092	Farmworkers, and Laborers, Crop, Nursery, and Greenhouse	52,716	58,462	5,746	11%	74.9%
45-2041	Graders and Sorters, Agricultural Products	2,226	2,528	302	14%	3.2%
45-2091	Agricultural Equipment Operators	1,619	2,213	594	37%	2.3%
53-7064	Packers and Packagers, Hand	1,603	1,998	395	25%	2.3%
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	1,538	1,685	147	10%	2.2%
51-9111	Packaging and Filling Machine Operators and Tenders	1,047	1,285	238	23%	1.5%
53-7051	Industrial Truck and Tractor Operators	677	839	162	24%	1.0%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	649	823	174	27%	0.9%
39-2021	Nonfarm Animal Caretakers	546	551	5	1%	0.8%
11-9013	Farmers, Ranchers, and Other Agricultural Managers	521	498	(23)	(4%)	0.7%
43-9061	Office Clerks, General	458	565	107	23%	0.7%
53-3032	Heavy and Tractor-Trailer Truck Drivers	428	551	123	29%	0.6%
51-9198	Helpers--Production Workers	395	475	80	20%	0.6%
39-2011	Animal Trainers	379	323	(56)	(15%)	0.5%
11-1021	General and Operations Managers	305	377	72	24%	0.4%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	289	347	58	20%	0.4%
49-3041	Farm Equipment Mechanics and Service Technicians	269	325	56	21%	0.4%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	224	279	55	25%	0.3%
49-9071	Maintenance and Repair Workers, General	218	273	55	25%	0.3%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	206	250	44	21%	0.3%
45-2011	Agricultural Inspectors	204	236	32	16%	0.3%
43-5071	Shipping, Receiving, and Traffic Clerks	194	230	36	19%	0.3%
45-2093	Farmworkers, Farm, Ranch, and Agricultural Animals	184	227	43	23%	0.3%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	179	227	48	27%	0.3%
51-9192	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders	143	176	33	23%	0.2%

Source: Emsi Employees & Self-Employed 2018.1.



TABLE A2.5: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Animal Production & Agriculture Industry Subsector

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	% of JOBS INDUSTRY
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	5,447	5,412	(35)	(1%)	36.9%
11-9013	Farmers, Ranchers, and Other Agricultural Managers	4,205	4,033	(172)	(4%)	28.5%
45-2093	Farmworkers, Farm, Ranch, and Agriculture Animals	708	698	(10)	(1%)	4.8%
45-2091	Agricultural Equipment Operators	580	641	61	11%	3.9%
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers	246	228	(18)	(7%)	1.7%
39-2011	Animal Trainers	230	247	17	7%	1.6%
39-2021	Nonfarm Animal Caretakers	181	189	8	4%	1.2%
53-3032	Heavy and Tractor-Trailer Truck Drivers	179	188	9	5%	1.2%
49-9071	Maintenance and Repair Workers, General	123	133	10	8%	0.8%
45-2099	Agricultural Workers, All Other	99	96	(3)	(3%)	0.7%
37-3011	Landscaping and Grounds keeping Workers	97	98	1	1%	0.7%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	96	93	(3)	(3%)	0.6%
53-3033	Light Truck or Delivery Services Drivers	90	94	4	4%	0.6%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	87	93	6	7%	0.6%
45-2041	Graders and Sorters, Agricultural Products	83	74	(9)	(11%)	0.6%
11-9199	Managers, All Other	71	76	5	7%	0.5%
53-7064	Packers and Packagers, Hand	71	76	5	7%	0.5%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	70	71	1	1%	0.5%
13-2011	Accountants and Auditors	65	75	10	15%	0.4%
11-1021	General and Operations Managers	58	62	4	7%	0.4%
53-7051	Industrial Truck and Tractor Operators	51	56	5	10%	0.3%
49-9041	Industrial Machinery Mechanics	50	61	11	22%	0.3%
43-9061	Office Clerks, General	50	51	1	2%	0.3%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	49	52	3	6%	0.3%
41-9099	Sales and Related Workers, All Other	49	55	6	12%	0.3%

Source: Emsi Employees & Self-Employed 2018.1.



TABLE A2.6: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Food Manufacturing Industry Subsector

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
51-9111	Packaging and Filling Machine Operators and Tenders	2,443	2,651	208	9%	9.7%
51-3092	Food Batch-makers	1,724	1,839	115	7%	6.9%
51-3023	Slaughterers and Meat Packers	1,515	1,782	267	18%	6.0%
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	1,233	1,521	288	23%	4.9%
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	1,145	1,267	122	11%	4.6%
53-7064	Packers and Packagers, Hand	1,000	1,118	118	12%	4.0%
51-9198	Helpers--Production Workers	966	992	26	3%	3.9%
53-7051	Industrial Truck and Tractor Operators	962	1,019	57	6%	3.8%
51-1011	First-Line Supervisors of Production and Operating Workers	774	855	81	10%	3.1%
49-9041	Industrial Machinery Mechanics	729	891	162	22%	2.9%
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	591	646	55	9%	2.4%
43-5071	Shipping, Receiving, and Traffic Clerks	505	517	12	2%	2.0%
51-3099	Food Processing Workers, All Other	487	547	60	12%	1.9%
51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	462	474	12	3%	1.8%
49-9071	Maintenance and Repair Workers, General	457	510	53	12%	1.8%
45-2041	Graders and Sorters, Agricultural Products	435	444	9	2%	1.7%
51-3093	Food Cooking Machine Operators and Tenders	433	502	69	16%	1.7%
53-7061	Cleaners of Vehicles and Equipment	432	468	36	8%	1.7%
51-2092	Team Assemblers	335	358	23	7%	1.3%
51-3011	Bakers	330	356	26	8%	1.3%
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders	327	353	26	8%	1.3%
51-3091	Food and Tobacco Roasting, Baking, and Drying Machine Operators and Tenders	311	331	20	6%	1.2%
53-3032	Heavy and Tractor-Trailer Truck Drivers	307	347	40	13%	1.2%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	298	326	28	9%	1.2%
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	277	300	23	8%	1.1%



TABLE A2.7: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Social Assistance Industry Subsector

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	INDUSTRY
39-9011	Childcare Workers	7,324	6,483	(841)	(11%)	18.6%
39-9021	Personal Care Aides	6,239	10,878	4,639	74%	15.8%
21-1093	Social and Human Service Assistants	1,540	1,950	410	27%	3.9%
43-9061	Office Clerks, General	1,316	1,566	250	19%	3.3%
31-1014	Nursing Assistants	1,288	1,679	391	30%	3.3%
31-1011	Home Health Aides	1,160	2,197	1,037	89%	2.9%
25-2011	Preschool Teachers, Except Special Education	1,062	1,170	108	10%	2.7%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	881	1,072	191	22%	2.2%
29-1141	Registered Nurses	843	1,081	238	28%	2.1%
21-1021	Child, Family, and School Social Workers	730	845	115	16%	1.9%
25-9041	Teacher Assistants	714	847	133	19%	1.8%
11-9151	Social and Community Service Managers	707	917	210	30%	1.8%
21-1015	Rehabilitation Counselors	624	780	156	25%	1.6%
11-1021	General and Operations Managers	563	700	137	24%	1.4%
39-9032	Recreation Workers	527	667	140	27%	1.3%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	520	621	101	19%	1.3%
21-1022	Healthcare Social Workers	474	643	169	36%	1.2%
29-2061	Licensed Practical and Licensed Vocational Nurses	435	561	126	29%	1.1%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	412	450	38	9%	1.0%
53-3022	Bus Drivers, School or Special Client	402	515	113	28%	1.0%
35-2012	Cooks, Institution and Cafeteria	372	476	104	28%	0.9%
21-1023	Mental Health and Substance Abuse Social Workers	331	409	78	24%	0.8%
39-1021	First-Line Supervisors of Personal Service Workers	325	479	154	47%	0.8%
21-1014	Mental Health Counselors	321	387	66	21%	0.8%
21-1012	Educational, Guidance, School, and Vocational Counselors	306	346	40	13%	0.8%

Source: Emsi Employees & Self-Employed 2018.1.

TABLE A2.8: Employment Projections in the FCC Service Region for the Top 25 Occupations Related to the Local Government Industry Subsector

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	% OF JOBS IN INDUSTRY
25-9041	Teacher Assistants	7,684	8,788	1,104	14%	8.0%
25-2021	Elementary School Teachers, Except Special Education	7,118	8,335	1,217	17%	7.5%
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	6,647	7,631	984	15%	7.0%
25-3098	Substitute Teachers	5,583	6,293	710	13%	5.8%
37-2011	Janitors and Cleaners, Except Maids and Housekeeping Cleaners	2,963	3,356	393	13%	3.1%
25-1099	Postsecondary Teachers	2,838	3,767	929	33%	3.0%
43-9061	Office Clerks, General	2,688	2,847	159	6%	2.8%
25-2022	Middle School Teachers, Except Special and Career/Technical Education	2,616	3,117	501	19%	2.7%
33-3051	Police and Sheriff's Patrol Officers	2,434	2,589	155	6%	2.5%
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	2,254	2,453	199	9%	2.4%
33-3012	Correctional Officers and Jailers	1,765	1,863	98	6%	1.8%
29-1141	Registered Nurses	1,568	1,804	236	15%	1.6%
49-9071	Maintenance and Repair Workers, General	1,260	1,372	112	9%	1.3%
11-9032	Education Administrators, Elementary and Secondary School	1,221	1,424	203	17%	1.3%
35-3021	Combined Food Preparation and Serving Workers, Including Fast Food	1,166	1,350	184	16%	1.2%
21-1012	Educational, Guidance, School, and Vocational Counselors	1,036	1,215	179	17%	1.1%
33-2011	Firefighters	1,035	1,108	73	7%	1.1%
25-3099	Teachers and Instructors, All Other	967	1,126	159	16%	1.0%
25-2052	Special Education Teachers, Kindergarten and Elementary School	882	1,043	161	18%	0.9%
25-2012	Kindergarten Teachers, Except Special Education	866	1,002	136	16%	0.9%
39-9011	Childcare Workers	838	956	118	14%	0.9%
43-3031	Bookkeeping, Accounting, and Auditing Clerks	821	791	(30)	(4%)	0.9%
53-3022	Bus Drivers, School or Special Client	804	950	146	18%	0.8%
43-4061	Eligibility Interviewers, Government Programs	802	844	42	5%	0.8%
37-3011	Landscaping and Groundskeeping Workers	644	696	52	8%	0.7%

Source: Emsi Employees & Self-Employed 2018.1.



WORKFORCE COMMUTING PATTERNS

TABLE A2.9: FCC Service Region Job Inflow and Outflow

COUNTY	JOB	COMMUTE SHARE
EMPLOYMENT PAT TERNS		
	Employed in the Economic Region	534,948 100%
	Employed in the Economic Region but Living Outside	94,513 18%
	Employed and Living in the Economic Region	440,435 82%
RESIDENTIAL PAT TERNS		
	Living in the Economic Region	551,255 100%
	Living in the Economic Region but Employed Outside	110,820 20%
	Living and Employed in the Economic Region	440,435 80%

Source: Census LEHD.

EDUCATIONAL ATTAINMENT

TABLE A2.10: Breakdown of Adult Population in the FCC Service Region by Educational Attainment, 2012 and 2017

EDUCATION LEVEL	2012 POPULATION	2012% DISTRIBUTION	2017 POPULATION	2017% DISTRIBUTION	POPULATION CHANGE	% DISTRIBUTION CHANGE
Less than high school diploma or equivalent	285,924	28%	310,858	29%	24,934	0.6%
High school diploma or equivalent	239,461	24%	255,771	24%	16,311	0.1%
Some college	233,380	23%	242,867	23%	9,488	(0.5%)
Associate degree	77,674	8%	81,730	8%	4,057	(0.1%)
Bachelor's degree	113,583	11%	120,354	11%	6,771	(0.0%)
Graduate degree or higher	53,638	5%	55,918	5%	2,280	(0.1%)

Source: Emsi Employees & Self-Employed 2018.1.

TABLE A2.11: Breakdown of Adult Population in the FCC Service Region by Educational Attainment and Gender

EDUCATION LEVEL	MALES	PROPORTION	FEMALES	PROPORTION
Less than high school diploma or equivalent	163,085	31%	147,773	27%
High school diploma or equivalent	130,434	25%	125,337	23%
Some college	114,643	22%	128,225	24%
Associate degree	35,967	7%	45,763	8%
Bachelor's degree	57,652	11%	62,702	12%
Graduate degree and higher	26,921	5%	28,997	5%

Source: Emsi Employees & Self-Employed 2018.1.

TABLE A2.12: Breakdown of Adult Population in the FCC Service Region by Educational Attainment and Ethnicity

ETHNICITY		LESS THAN HIGH SCHOOL DIPLOMA	HIGH SCHOOL DIPLOMA	SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE	GRADUATE DEGREE AND HIGHER
White, non-hispanic	Count	37,188	99,838	116,384	36,029	71,369	33,402
	Percent	9%	25%	30%	9%	18%	8%
Black, non-hispanic	Count	8,272	10,969	13,194	3,202	3,721	2,447
	Percent	20%	26%	32%	8%	9%	6%
American Indian or Alaskan native, non-hispanic	Count	2,428	2,142	1,988	694	545	309
	Percent	30%	26%	25%	9%	7%	4%
Asian, non-hispanic	Count	20,308	14,846	12,437	8,332	18,004	6,492
	Percent	25%	18%	15%	10%	22%	8%
Native Hawaiian or Pacific Islander, non-hispanic	Count	295	330	341	206	181	53
	Percent	21%	23%	24%	15%	13%	4%
Two or more races, non-hispanic	Count	2,987	3,094	3,628	1,156	1,639	816
	Percent	22%	23%	27%	9%	12%	6%
Hispanic, all types	Count	239,380	124,552	94,896	32,112	24,895	12,399
	Percent	45%	24%	18%	6%	5%	2%



APPENDIX 3: PROGRAM-TO-OCCUPATION MAPPING

Table A3.1 displays the crosswalk between educational programs (TOP codes) and occupations (SOC codes) that Emsi used to complete the program demand gap analysis. Also listed are the adjustment factors which were applied to the annual openings figures for each occupation within each program. The methodology for these factors is described in Appendix 4, with the program based weight figure discussed under “De-duplication of Annual Openings” and the educational level adjustments explained under “Education Level Adjustments.”

TABLE A3.1: Program to Occupation Mapping with Employment Adjustment Factors

TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
*109.10	Landscape Design and Maintenance	37-1012	First-Line Supervisors of Landscaping, Lawn Service, & Groundskeeping Workers	0.05	69	80	98
		37-3011	Landscaping & Groundskeeping Workers	0.05	88	93	99
		37-3012	Pesticide Handlers, Sprayers, & Applicators, Vegetation	0.05	88	93	99
201.00	Architecture and Architectural Technology	13-1051	Cost Estimators	0.02	54	65	95
		13-1199	Business Operations Specialists, All Other	0.02	27	34	75
		17-1011	Architects, Except Landscape & Naval	1.00	6	9	57
		17-1012	Landscape Architects	0.46	6	9	57
		17-3011	Architectural & Civil Drafters	0.25	40	73	96
		47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	0.16	81	89	98
		47-4011	Construction & Building Inspectors	0.08	57	72	94
*201.00	Architecture and Architectural Technology	17-1012	Landscape Architects	0.54	6	9	57
		17-3011	Architectural & Civil Drafters	0.30	40	73	96
2203.00	Ethnic Studies	13-1041	Compliance Officers	0.01	27	36	76
		19-3041	Sociologists	0.01	9	11	47

TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		19-3051	Urban & Regional Planners	0.02	9	10	47
		19-3091	Anthropologists & Archeologists	0.01	9	11	47
		19-3092	Geographers	0.02	9	11	47
		19-3093	Historians	0.02	9	11	47
		19-3094	Political Scientists	0.01	9	11	47
		19-4061	Social Science Research Assistants	0.01	39	53	85
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-4013	Museum Technicians & Conservators	0.01	15	18	49
		27-3091	Interpreters & Translators	0.03	34	47	80
2201.10	Women's Studies	13-1041	Compliance Officers	0.02	27	36	76
		19-3041	Sociologists	0.02	9	11	47
		19-3051	Urban & Regional Planners	0.04	9	10	47
		19-3091	Anthropologists & Archeologists	0.03	9	11	47
		19-3092	Geographers	0.04	9	11	47
		19-3093	Historians	0.04	9	11	47
		19-3094	Political Scientists	0.03	9	11	47
		19-4061	Social Science Research Assistants	0.01	39	53	85
		25-1099	Postsecondary Teachers	0.00	4	7	23
1506.00	Speech Communication	11-2031	Public Relations & Fundraising Managers	0.92	9	12	71
		11-1031	Legislators	0.47	25	31	70
		25-1099	Postsecondary Teachers	0.03	4	7	23
		27-3011	Radio & Television Announcers	0.93	49	57	93
		27-3012	Public Address System & Other Announcers	0.96	49	57	93
		27-3022	Reporters & Correspondents	0.67	12	15	77
		27-3031	Public Relations Specialists	0.76	13	17	74
		27-3043	Writers & Authors	0.59	14	17	68
602.00	Journalism	25-1099	Postsecondary Teachers	0.00	4	7	23
		27-2012	Producers & Directors	0.13	19	24	84
		27-3011	Radio & Television Announcers	0.02	49	57	93
		27-3021	Broadcast News Analysts	0.36	12	15	77



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		27-3022	Reporters & Correspondents	0.02	12	15	77
		27-3041	Editors	0.04	14	17	73
		27-3042	Technical Writers	0.05	16	22	71
		27-3043	Writers & Authors	0.02	14	17	68
		27-4013	Radio Operators	1.00	49	65	96
		27-4021	Photographers	0.04	38	49	91
		27-4032	Film & Video Editors	0.22	24	35	89
1012.00	Applied Photography	27-4011	Audio & Video Equipment Technicians	0.29	49	65	96
		27-4021	Photographers	0.15	38	49	91
		27-4031	Camera Operators, Television, Video, & Motion Picture	0.98	24	35	89
		27-4032	Film & Video Editors	0.74	24	35	89
		51-9151	Photographic Process Workers & Processing Machine Operators	0.95	54	64	94
1005.00	Commercial Music	25-9011	Audio-Visual & Multimedia Collections Specialists	0.61	13	17	48
		27-4011	Audio & Video Equipment Technicians	0.06	49	65	96
		27-4012	Broadcast Technicians	1.00	49	65	96
		27-4014	Sound Engineering Technicians	0.05	49	65	96
936.00	Printing and Lithography	43-9021	Data Entry Keyers	0.00	62	75	96
		51-5111	Prepress Technicians & Workers	0.69	68	82	97
		51-5112	Printing Press Operators	1.00	83	91	99
*614.00	Digital Media	27-1014	Multimedia Artists & Animators	0.02	33	41	87
		27-1024	Graphic Designers	0.02	29	41	89
		43-9031	Desktop Publishers	0.02	49	62	91
702.00	Computer Information Systems	11-3021	Computer & Information Systems Managers	0.35	18	26	72
		15-1111	Computer & Information Research Scientists	0.42	8	8	43
		15-1121	Computer Systems Analysts	0.34	19	26	74
		15-1122	Information Security Analysts	0.24	22	32	75
		15-1131	Computer Programmers	0.37	18	27	78
		15-1132	Software Developers, Applications	0.43	11	16	66



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		15-1133	Software Developers, Systems Software	0.43	11	16	66
		15-1141	Database Administrators	0.37	19	28	73
		15-1142	Network & Computer Systems Administrators	0.31	31	46	87
		15-1143	Computer Network Architects	0.30	29	41	81
		15-1151	Computer User Support Specialists	0.36	35	51	88
		15-1152	Computer Network Support Specialists	0.27	35	51	88
		15-1199	Computer Occupations, All Other	0.04	29	44	83
		43-9011	Computer Operators	0.35	55	68	93
		43-9021	Data Entry Keyers	0.06	62	75	96
702.10	Software Applications	43-4071	File Clerks	0.05	64	77	95
		43-9011	Computer Operators	0.25	55	68	93
		43-9021	Data Entry Keyers	0.04	62	75	96
		43-9022	Word Processors & Typists	0.09	63	77	95
		43-9061	Office Clerks, General	0.02	64	77	96
614.30	Website Design and Development	15-1131	Computer Programmers	0.05	18	27	78
		15-1134	Web Developers	0.07	21	31	85
		15-1199	Computer Occupations, All Other	0.01	29	44	83
		27-1014	Multimedia Artists & Animators	0.05	33	41	87
		27-1024	Graphic Designers	0.05	29	41	89
708.10	Computer Networking	11-3021	Computer & Information Systems Managers	0.15	18	26	72
		13-1199	Business Operations Specialists, All Other	0.02	27	34	75
		15-1111	Computer & Information Research Scientists	0.18	8	8	43
		15-1121	Computer Systems Analysts	0.14	19	26	74
		15-1122	Information Security Analysts	0.11	22	32	75
		15-1131	Computer Programmers	0.16	18	27	78
		15-1141	Database Administrators	0.16	19	28	73
		15-1142	Network & Computer Systems Administrators	0.13	31	46	87
		15-1143	Computer Network Architects	0.13	29	41	81
		15-1152	Computer Network Support Specialists	0.12	35	51	88



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
708.00	Computer Infrastructure and Support	15-1199	Computer Occupations, All Other	0.02	29	44	83
		11-3021	Computer & Information Systems Managers	0.09	18	26	72
		13-1199	Business Operations Specialists, All Other	0.01	27	34	75
		15-1121	Computer Systems Analysts	0.08	19	26	74
		15-1122	Information Security Analysts	0.06	22	32	75
		15-1141	Database Administrators	0.09	19	28	73
		15-1142	Network & Computer Systems Administrators	0.08	31	46	87
		15-1143	Computer Network Architects	0.07	29	41	81
		15-1152	Computer Network Support Specialists	0.07	35	51	88
		15-1199	Computer Occupations, All Other	0.01	29	44	83
709.00	World Wide Web Administration	15-2041	Statisticians	0.03	4	6	37
		15-1134	Web Developers	0.02	21	31	85
		15-1141	Database Administrators	0.02	19	28	73
		15-1199	Computer Occupations, All Other	0.00	29	44	83
*799.00	Other Information Technology	15-1131	Computer Programmers	0.06	18	27	78
		15-1132	Software Developers, Applications	0.08	11	16	66
		15-1133	Software Developers, Systems Software	0.08	11	16	66
		15-1134	Web Developers	0.08	21	31	85
		15-1151	Computer User Support Specialists	0.06	35	51	88
		15-1152	Computer Network Support Specialists	0.05	35	51	88
		15-1199	Computer Occupations, All Other	0.01	29	44	83
		43-9011	Computer Operators	0.06	55	68	93
		43-9021	Data Entry Keyers	0.01	62	75	96
		1307.10	Restaurant and Food Services and Management	11-9051	Food Service Managers	0.21	65
35-1011	Chefs & Head Cooks			0.17	69	86	98
35-1012	First-Line Supervisors of Food Preparation & Serving Workers			0.21	75	85	98
35-2013	Cooks, Private Household			0.23	89	94	99



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
1306.30	Culinary Arts	11-9051	Food Service Managers	0.07	65	74	96
		35-1011	Chefs & Head Cooks	0.06	69	86	98
		35-1012	First-Line Supervisors of Food Preparation & Serving Workers	0.07	75	85	98
		35-2012	Cooks, Institution & Cafeteria	0.09	89	94	99
		35-2014	Cooks, Restaurant	0.09	89	94	99
		35-2015	Cooks, Short Order	0.09	89	94	99
		35-2019	Cooks, All Other	0.09	89	94	99
809.00	Special Education	25-2051	Special Education Teachers, Preschool	0.15	11	15	50
		25-2052	Special Education Teachers, Kindergarten & Elementary School	0.15	11	15	50
		25-2053	Special Education Teachers, Middle School	0.49	11	15	50
		25-2054	Special Education Teachers, Secondary School	0.49	11	15	50
		25-2059	Special Education Teachers, All Other	0.08	11	15	50
		25-9041	Teacher Assistants	0.02	60	74	95
		27-3091	Interpreters & Translators	0.14	34	47	80
1305.20	Children with Special Needs	25-2051	Special Education Teachers, Preschool	0.08	11	15	50
		25-2052	Special Education Teachers, Kindergarten & Elementary School	0.08	11	15	50
		25-9041	Teacher Assistants	0.01	60	74	95
839.00	Industrial Arts (Transfer)	25-1099	Postsecondary Teachers	0.00	4	7	23
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.00	3	5	49
		25-2023	Career/Technical Education Teachers, Middle School	0.01	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.00	3	5	46
		25-2032	Career/Technical Education Teachers, Secondary School	0.01	3	5	46
802.00	Educational Aide (Teacher Assistant)	25-3099	Teachers & Instructors, All Other	1.00	30	39	75
		25-9041	Teacher Assistants	0.03	60	74	95



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
*802.00	Educational Aide (Teacher Assistant)	25-9041	Teacher Assistants	0.01	60	74	95
901.00	Engineering, General	11-9041	Architectural & Engineering Managers	0.08	11	15	61
		17-2011	Aerospace Engineers	0.15	9	14	63
		17-2021	Agricultural Engineers	0.60	6	23	66
		17-2031	Biomedical Engineers	0.45	6	23	66
		17-2041	Chemical Engineers	0.18	6	10	66
		17-2051	Civil Engineers	0.17	10	15	70
		17-2061	Computer Hardware Engineers	0.20	17	24	71
		17-2071	Electrical Engineers	0.27	12	21	70
		17-2072	Electronics Engineers, Except Computer	0.26	12	21	70
		17-2081	Environmental Engineers	0.12	9	13	60
		17-2111	Health & Safety Engineers, Except Mining Safety Engineers & Inspectors	0.30	20	29	80
		17-2112	Industrial Engineers	0.60	20	29	80
		17-2121	Marine Engineers & Naval Architects	0.60	16	25	78
		17-2131	Materials Engineers	0.60	19	27	72
		17-2141	Mechanical Engineers	0.19	14	24	75
		17-2151	Mining & Geological Engineers, Including Mining Safety Engineers	0.14	13	16	71
		17-2161	Nuclear Engineers	0.25	11	18	66
		17-2171	Petroleum Engineers	0.14	13	16	71
		17-2199	Engineers, All Other	0.06	11	18	66
934.30	Telecommunications Technology	11-9041	Architectural & Engineering Managers	0.07	11	15	61
		17-2072	Electronics Engineers, Except Computer	0.23	12	21	70
		17-2199	Engineers, All Other	0.05	11	18	66
		25-1099	Postsecondary Teachers	0.00	4	7	23
946.00	Environmental Control Technology	17-3025	Environmental Engineering Technicians	0.80	57	80	97
		17-3029	Engineering Technicians, Except Drafters, All Other	0.16	57	80	97



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
956.00	Manufacturing and Industrial Technology	47-2211	Sheet Metal Workers	0.10	87	95	99
		49-9021	Heating, Air Conditioning, & Refrigeration Mechanics & Installers	0.12	80	94	99
		49-9071	Maintenance & Repair Workers, General	0.06	82	93	99
		51-8021	Stationary Engineers & Boiler Operators	1.00	76	87	97
		17-3026	Industrial Engineering Technicians	0.05	57	80	97
		51-1011	First-Line Supervisors of Production & Operating Workers	1.00	74	83	96
		51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	0.15	88	95	100
		51-2022	Electrical & Electronic Equipment Assemblers	0.36	85	94	99
		51-2023	Electromechanical Equipment Assemblers	0.36	85	94	99
		51-2031	Engine & Other Machine Assemblers	1.00	84	91	100
		51-2092	Team Assemblers	1.00	87	93	99
		51-2093	Timing Device Assemblers & Adjusters	1.00	87	93	99
		51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	1.00	82	87	99
		51-3092	Food Batchmakers	1.00	82	92	99
		51-3093	Food Cooking Machine Operators & Tenders	1.00	87	93	100
		51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	0.22	81	93	99
		51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	0.35	81	93	99
		51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	0.30	89	95	99
		51-4022	Forging Machine Setters, Operators, & Tenders, Metal & Plastic	0.30	91	93	100
		51-4023	Rolling Machine Setters, Operators, & Tenders, Metal & Plastic	0.30	91	95	98
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	0.30	91	96	100		
51-4032	Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal & Plastic	0.30	91	96	100		



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	0.30	91	96	100
		51-4034	Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal & Plastic	0.30	91	96	100
		51-4035	Milling & Planing Machine Setters, Operators, & Tenders, Metal & Plastic	0.30	91	96	100
		51-4061	Model Makers, Metal & Plastic	1.00	87	94	100
		51-4062	Patternmakers, Metal & Plastic	1.00	87	94	100
		51-4072	Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	1.00	87	94	100
		51-4081	Multiple Machine Tool Setters, Operators, & Tenders, Metal & Plastic	0.30	89	95	99
		51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	0.15	89	97	100
		51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	0.30	89	95	99
		51-4192	Layout Workers, Metal & Plastic	0.30	89	95	99
		51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	1.00	89	95	99
		51-6061	Textile Bleaching & Dyeing Machine Operators & Tenders	1.00	90	92	99
		51-6062	Textile Cutting Machine Setters, Operators, & Tenders	1.00	90	92	99
		51-6063	Textile Knitting & Weaving Machine Setters, Operators, & Tenders	1.00	84	90	95
		51-6064	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders	1.00	94	98	99
		51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	1.00	82	88	99
		51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	1.00	91	96	100
		51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	1.00	91	95	99
		51-9012	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	1.00	66	74	95
		51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	1.00	87	93	99



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		51-9023	Mixing & Blending Machine Setters, Operators, & Tenders	1.00	87	93	99
		51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	1.00	92	97	99
		51-9041	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	1.00	92	97	100
		51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	1.00	85	91	99
		51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	0.22	72	83	97
		51-9111	Packaging & Filling Machine Operators & Tenders	1.00	91	95	99
		51-9121	Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	1.00	91	95	99
		51-9123	Painting, Coating, & Decorating Workers	1.00	91	95	99
		51-9191	Adhesive Bonding Machine Operators & Tenders	1.00	92	95	99
		51-9192	Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders	1.00	87	93	99
		51-9193	Cooling & Freezing Equipment Operators & Tenders	1.00	87	93	99
		51-9195	Molders, Shapers, & Casters, Except Metal & Plastic	1.00	78	84	95
		51-9196	Paper Goods Machine Setters, Operators, & Tenders	1.00	89	96	100
		51-9198	Helpers--Production Workers	1.00	90	93	98
		53-7011	Conveyor Operators & Tenders	1.00	88	95	100
953.00	Drafting Technology	17-3011	Architectural & Civil Drafters	0.17	40	73	96
		17-3012	Electrical & Electronics Drafters	0.51	40	73	96
		17-3013	Mechanical Drafters	0.35	40	73	96
		17-3019	Drafters, All Other	1.00	40	73	96
		27-1021	Commercial & Industrial Designers	0.14	29	41	89
		51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	0.65	81	93	99
999.00	Other Engineering and Related Industrial Technologies	17-3024	Electro-Mechanical Technicians	0.14	57	80	97
		17-3026	Industrial Engineering Technicians	0.05	57	80	97
		17-3029	Engineering Technicians, Except Drafters, All Other	0.04	57	80	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
1101.00	Foreign Languages, General	49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment	0.02	62	83	98
		51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	0.23	81	93	99
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-2021	Elementary School Teachers, Except Special Education	0.00	3	5	49
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.00	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.00	3	5	46
		27-3091	Interpreters & Translators	0.00	34	47	80
1105.00	Spanish	39-7011	Tour Guides & Escorts	0.01	46	54	85
		39-7012	Travel Guides	0.01	46	54	85
		25-1099	Postsecondary Teachers	0.01	4	7	23
		25-2021	Elementary School Teachers, Except Special Education	0.11	3	5	49
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.07	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.04	3	5	46
		25-3011	Adult Basic & Secondary Education & Literacy Teachers & Instructors	0.56	30	39	75
		27-3091	Interpreters & Translators	0.42	34	47	80
		33-3021	Detectives & Criminal Investigators	0.07	33	45	86
		39-7011	Tour Guides & Escorts	0.94	46	54	85
850.00	Sign Language	39-7012	Travel Guides	0.94	46	54	85
		25-2051	Special Education Teachers, Preschool	0.11	11	15	50
		25-2052	Special Education Teachers, Kindergarten & Elementary School	0.11	11	15	50
		25-2053	Special Education Teachers, Middle School	0.36	11	15	50
		25-2054	Special Education Teachers, Secondary School	0.36	11	15	50
		25-9041	Teacher Assistants	0.02	60	74	95
		27-3091	Interpreters & Translators	0.10	34	47	80



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
850.10	Sign Language Interpreting	25-2051	Special Education Teachers, Preschool	0.02	11	15	50
		25-2052	Special Education Teachers, Kindergarten & Elementary School	0.02	11	15	50
		25-2053	Special Education Teachers, Middle School	0.07	11	15	50
		25-2054	Special Education Teachers, Secondary School	0.07	11	15	50
		25-9041	Teacher Assistants	0.00	60	74	95
		27-3091	Interpreters & Translators	0.02	34	47	80
1306.00	Nutrition, Foods, and Culinary Arts	11-9039	Education Administrators, All Other	0.01	13	18	42
		11-9051	Food Service Managers	0.01	65	74	96
		21-1094	Community Health Workers	0.00	37	44	78
		29-1031	Dietitians & Nutritionists	0.00	25	29	66
		29-2051	Dietetic Technicians	0.00	57	78	96
		35-1012	First-Line Supervisors of Food Preparation & Serving Workers	0.01	75	85	98
1306.20	Dietetic Services and Management	11-9051	Food Service Managers	0.02	65	74	96
		25-1099	Postsecondary Teachers	0.00	4	7	23
		29-1031	Dietitians & Nutritionists	0.01	25	29	66
		35-1012	First-Line Supervisors of Food Preparation & Serving Workers	0.02	75	85	98
		35-2012	Cooks, Institution & Cafeteria	0.02	89	94	99
1305.60	Parenting and Family Education	11-9151	Social & Community Service Managers	0.00	22	28	66
		21-1021	Child, Family, & School Social Workers	0.00	16	22	63
		21-1093	Social & Human Service Assistants	0.00	43	54	85
		25-9021	Farm & Home Management Advisors	0.00	13	17	48
1305.00	Child Development/Early Care and Education	21-1021	Child, Family, & School Social Workers	0.40	16	22	63
		21-1093	Social & Human Service Assistants	0.62	43	54	85
		25-9041	Teacher Assistants	0.74	60	74	95
		39-9011	Childcare Workers	0.81	71	81	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
1303.20	Fashion Merchandising	11-2021	Marketing Managers	0.14	24	31	81
		13-1022	Wholesale & Retail Buyers, Except Farm Products	0.19	54	63	95
		27-1022	Fashion Designers	0.12	29	41	89
514.10	Legal Office Technology	23-1012	Judicial Law Clerks	0.20	6	9	22
		43-1011	First-Line Supervisors of Office & Administrative Support Workers	0.01	53	65	91
		43-4021	Correspondence Clerks	0.05	69	79	97
		43-4031	Court, Municipal, & License Clerks	0.59	59	73	94
		43-4071	File Clerks	0.01	64	77	95
		43-6011	Executive Secretaries & Executive Administrative Assistants	0.01	62	77	96
		43-6012	Legal Secretaries	0.16	62	77	96
		43-9061	Office Clerks, General	0.01	64	77	96
1402.00	Paralegal	13-1041	Compliance Officers	0.14	27	36	76
		23-2011	Paralegals & Legal Assistants	1.00	36	56	91
		23-2093	Title Examiners, Abstractors, & Searchers	1.00	44	58	87
		23-2099	Legal Support Workers, All Other	1.00	44	58	87
		43-6012	Legal Secretaries	0.84	62	77	96
1501.00	English	25-1099	Postsecondary Teachers	0.01	4	7	23
		25-2021	Elementary School Teachers, Except Special Education	0.19	3	5	49
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.12	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.08	3	5	46
		25-4021	Librarians	1.00	11	15	38
		25-4031	Library Technicians	0.91	53	62	87
		27-3022	Reporters & Correspondents	0.28	12	15	77
		27-3041	Editors	0.72	14	17	73
		27-3042	Technical Writers	0.85	16	22	71
		27-3043	Writers & Authors	0.25	14	17	68
43-9031	Desktop Publishers	0.66	49	62	91		



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		43-9081	Proofreaders & Copy Markers	1.00	33	38	82
1602.00	Library Technician (Aide)	25-4031	Library Technicians	0.09	53	62	87
401.00	Biology, General	11-9121	Natural Sciences Managers	0.42	6	9	42
		15-2041	Statisticians	0.57	4	6	37
		19-1011	Animal Scientists	0.63	0	0	54
		19-1013	Soil & Plant Scientists	0.52	0	0	54
		19-1021	Biochemists & Biophysicists	0.70	0	0	48
		19-1022	Microbiologists	0.96	0	0	48
		19-1023	Zoologists & Wildlife Biologists	0.96	0	0	48
		19-1029	Biological Scientists, All Other	0.93	0	0	48
		19-1041	Epidemiologists	1.00	1	2	24
		19-1042	Medical Scientists, Except Epidemiologists	0.95	1	2	24
		19-1099	Life Scientists, All Other	0.97	1	2	24
		19-4021	Biological Technicians	0.97	39	55	86
		19-4091	Environmental Science & Protection Technicians, Including Health	0.96	39	53	85
		25-1099	Postsecondary Teachers	0.03	4	7	23
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.19	3	5	46
1701.00	Mathematics, General	11-9121	Natural Sciences Managers	0.16	6	9	42
		15-2021	Mathematicians	0.94	4	6	37
		15-2031	Operations Research Analysts	0.98	20	26	67
		15-2041	Statisticians	0.22	4	6	37
		15-2091	Mathematical Technicians	1.00	4	6	37
		15-2099	Mathematical Science Occupations, All Other	0.98	4	6	37
		25-1099	Postsecondary Teachers	0.01	4	7	23
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.12	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.07	3	5	46
		43-9111	Statistical Assistants	0.52	59	70	91



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
4902.00	Biological and Physical Sciences (and Mathematics)	11-9121	Natural Sciences Managers	0.21	6	9	42
836.00	Recreation	25-1099	Postsecondary Teachers	0.01	4	7	23
		25-3021	Self-Enrichment Education Teachers	0.25	30	39	75
		29-1125	Recreational Therapists	0.10	13	21	86
		33-9092	Lifeguards, Ski Patrol, & Other Recreational Protective Service Workers	0.49	48	60	93
		39-3091	Amusement & Recreation Attendants	0.93	66	74	94
		39-9032	Recreation Workers	0.16	41	51	89
1509.00	Philosophy	11-9199	Managers, All Other	0.01	35	43	79
		11-1031	Legislators	0.05	25	31	70
		23-1011	Lawyers	0.42	1	2	7
1901.00	Physical Sciences, General	25-1099	Postsecondary Teachers	0.00	4	7	23
		11-9121	Natural Sciences Managers	0.01	6	9	42
		17-2041	Chemical Engineers	0.10	6	10	66
		17-2081	Environmental Engineers	0.07	9	13	60
		17-2151	Mining & Geological Engineers, Including Mining Safety Engineers	0.08	13	16	71
		17-2161	Nuclear Engineers	0.14	11	18	66
		17-2171	Petroleum Engineers	0.08	13	16	71
		17-2199	Engineers, All Other	0.03	11	18	66
		19-1012	Food Scientists & Technologists	0.04	0	0	54
		19-1013	Soil & Plant Scientists	0.02	0	0	54
		19-1021	Biochemists & Biophysicists	0.02	0	0	48
		19-1031	Conservation Scientists	0.14	0	0	77
		19-2011	Astronomers	0.25	0	0	18
		19-2012	Physicists	0.24	0	0	18
		19-2021	Atmospheric & Space Scientists	0.13	6	9	54
		19-2031	Chemists	0.15	5	6	59
19-2032	Materials Scientists	0.10	5	6	59		



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		19-2041	Environmental Scientists & Specialists, Including Health	0.02	0	0	52
		19-2042	Geoscientists, Except Hydrologists & Geographers	0.36	0	0	52
		19-2043	Hydrologists	0.33	0	0	52
		19-4031	Chemical Technicians	0.15	51	66	91
		19-4041	Geological & Petroleum Technicians	0.09	48	65	91
		19-4051	Nuclear Technicians	0.25	48	65	91
		19-4092	Forensic Science Technicians	0.13	39	53	85
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.01	3	5	46
		25-4013	Museum Technicians & Conservators	0.03	15	18	49
1914.00	Geology	11-3051	Industrial Production Managers	0.01	48	56	87
		11-9121	Natural Sciences Managers	0.02	6	9	42
		15-1199	Computer Occupations, All Other	0.01	29	44	83
		17-1022	Surveyors	0.58	14	20	86
		17-2081	Environmental Engineers	0.12	9	13	60
		17-2151	Mining & Geological Engineers, Including Mining Safety Engineers	0.13	13	16	71
		17-2171	Petroleum Engineers	0.13	13	16	71
		19-1013	Soil & Plant Scientists	0.03	0	0	54
		19-1031	Conservation Scientists	0.25	0	0	77
		19-2021	Atmospheric & Space Scientists	0.23	6	9	54
		19-2042	Geoscientists, Except Hydrologists & Geographers	0.64	0	0	52
		19-2043	Hydrologists	0.58	0	0	52
		19-4041	Geological & Petroleum Technicians	0.16	48	65	91
		25-1099	Postsecondary Teachers	0.00	4	7	23
		49-9099	Installation, Maintenance, & Repair Workers, All Other	0.34	80	90	98
1902.00	Physics, General	11-9121	Natural Sciences Managers	0.04	6	9	42
		17-2161	Nuclear Engineers	0.43	11	18	66
		19-1021	Biochemists & Biophysicists	0.07	0	0	48



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		19-2011	Astronomers	0.75	0	0	18
		19-2012	Physicists	0.72	0	0	18
		19-2021	Atmospheric & Space Scientists	0.39	6	9	54
		19-2032	Materials Scientists	0.31	5	6	59
		19-4051	Nuclear Technicians	0.75	48	65	91
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.02	3	5	46
2001.00	Psychology, General	11-9199	Managers, All Other	0.19	35	43	79
		19-3031	Clinical, Counseling, & School Psychologists	0.83	0	0	7
		19-3032	Industrial-Organizational Psychologists	1.00	0	0	7
		19-3039	Psychologists, All Other	1.00	0	0	7
		21-1011	Substance Abuse & Behavioral Disorder Counselors	0.62	15	20	45
		21-1012	Educational, Guidance, School, & Vocational Counselors	0.84	15	20	45
		21-1013	Marriage & Family Therapists	0.66	15	20	45
		21-1014	Mental Health Counselors	0.80	15	20	45
		21-1015	Rehabilitation Counselors	0.60	15	20	45
		21-1021	Child, Family, & School Social Workers	0.32	16	22	63
		21-1022	Healthcare Social Workers	0.69	16	22	63
		21-1023	Mental Health & Substance Abuse Social Workers	0.64	16	22	63
		25-1099	Postsecondary Teachers	0.06	4	7	23
		29-1066	Psychiatrists	1.00	1	1	2
		31-1013	Psychiatric Aides	0.72	80	91	98
2105.10	Corrections	21-1092	Probation Officers & Correctional Treatment Specialists	0.27	18	23	81
		25-1099	Postsecondary Teachers	0.02	4	7	23
		33-1011	First-Line Supervisors of Correctional Officers	0.80	59	75	95
		33-1012	First-Line Supervisors of Police & Detectives	0.16	41	58	88
		33-3012	Correctional Officers & Jailers	0.80	68	82	98
		33-9032	Security Guards	0.24	74	84	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
2105.40	Forensics, Evidence, and Investigation	13-1041	Compliance Officers	0.02	27	36	76
		19-4092	Forensic Science Technicians	0.10	39	53	85
		25-1099	Postsecondary Teachers	0.00	4	7	23
		33-2021	Fire Inspectors & Investigators	0.03	55	76	96
		33-3021	Detectives & Criminal Investigators	0.01	33	45	86
2105.00	Administration of Justice	11-9161	Emergency Management Directors	0.66	26	37	77
		25-1099	Postsecondary Teachers	0.06	4	7	23
		33-1012	First-Line Supervisors of Police & Detectives	0.41	41	58	88
		33-3011	Bailiffs	0.89	68	82	98
		33-3021	Detectives & Criminal Investigators	0.52	33	45	86
		33-3051	Police & Sheriff's Patrol Officers	0.70	45	61	94
		33-3052	Transit & Railroad Police	0.85	45	61	94
		33-9021	Private Detectives & Investigators	0.91	29	38	84
		33-9032	Security Guards	0.63	74	84	97
		2133.00	Fire Technology	17-2111	Health & Safety Engineers, Except Mining Safety Engineers & Inspectors	0.51	20
33-1021	First-Line Supervisors of Fire Fighting & Prevention Workers			0.12	49	70	94
33-2011	Firefighters			0.12	54	77	97
33-2021	Fire Inspectors & Investigators			0.12	55	76	96
33-2022	Forest Fire Inspectors & Prevention Specialists			0.13	55	76	96
2133.50	Fire Academy	33-1021	First-Line Supervisors of Fire Fighting & Prevention Workers	0.31	49	70	94
		33-2011	Firefighters	0.32	54	77	97
		33-2021	Fire Inspectors & Investigators	0.31	55	76	96
		33-2022	Forest Fire Inspectors & Prevention Specialists	0.34	55	76	96
*2105.10	Corrections	11-9161	Emergency Management Directors	0.19	26	37	77
		11-9199	Managers, All Other	0.05	35	43	79
		13-1075	Labor Relations Specialists	0.36	30	38	82
		13-1199	Business Operations Specialists, All Other	0.08	27	34	75



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		33-1012	First-Line Supervisors of Police & Detectives	0.12	41	58	88
		33-3051	Police & Sheriff's Patrol Officers	0.20	45	61	94
		43-5031	Police, Fire, & Ambulance Dispatchers	0.60	72	83	98
*2133.00	Fire Technology	33-1021	First-Line Supervisors of Fire Fighting & Prevention Workers	0.34	49	70	94
		33-2011	Firefighters	0.35	54	77	97
		33-2021	Fire Inspectors & Investigators	0.34	55	76	96
		33-2022	Forest Fire Inspectors & Prevention Specialists	0.37	55	76	96
2104.00	Human Services	11-9151	Social & Community Service Managers	0.05	22	28	66
		21-1011	Substance Abuse & Behavioral Disorder Counselors	0.10	15	20	45
		21-1013	Marriage & Family Therapists	0.10	15	20	45
		21-1014	Mental Health Counselors	0.12	15	20	45
		21-1015	Rehabilitation Counselors	0.09	15	20	45
		21-1021	Child, Family, & School Social Workers	0.05	16	22	63
		21-1022	Healthcare Social Workers	0.11	16	22	63
		21-1023	Mental Health & Substance Abuse Social Workers	0.10	16	22	63
		21-1091	Health Educators	0.28	37	44	78
		21-1093	Social & Human Service Assistants	0.08	43	54	85
		21-1094	Community Health Workers	0.27	37	44	78
		21-1099	Community & Social Service Specialists, All Other	1.00	37	44	78
		43-4061	Eligibility Interviewers, Government Programs	1.00	39	53	91
		43-4171	Receptionists & Information Clerks	0.09	71	84	97
*2104.00	Human Services	21-1011	Substance Abuse & Behavioral Disorder Counselors	0.03	15	20	45
		21-1015	Rehabilitation Counselors	0.03	15	20	45
2201.00	Social Sciences, General	11-9199	Managers, All Other	0.06	35	43	79
		11-1031	Legislators	0.32	25	31	70
		19-2041	Environmental Scientists & Specialists, Including Health	0.38	0	0	52
		19-3011	Economists	0.81	0	0	23
		19-3022	Survey Researchers	0.87	9	11	47

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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		19-3041	Sociologists	0.28	9	11	47
		19-3051	Urban & Regional Planners	0.73	9	10	47
		19-3091	Anthropologists & Archeologists	0.52	9	11	47
		19-3092	Geographers	0.71	9	11	47
		19-3094	Political Scientists	0.47	9	11	47
		19-3099	Social Scientists & Related Workers, All Other	1.00	9	11	47
		19-4061	Social Science Research Assistants	0.25	39	53	85
		25-1099	Postsecondary Teachers	0.02	4	7	23
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.12	3	5	46
2202.00	Anthropology	11-9199	Managers, All Other	0.01	35	43	79
		19-3091	Anthropologists & Archeologists	0.07	9	11	47
		19-3092	Geographers	0.10	9	11	47
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-4012	Curators	0.09	15	18	49
		25-4013	Museum Technicians & Conservators	0.07	15	18	49
2202.20	Archaeology	11-9199	Managers, All Other	0.00	35	43	79
		19-3091	Anthropologists & Archeologists	0.00	9	11	47
		19-3093	Historians	0.01	9	11	47
		25-1099	Postsecondary Teachers	0.00	4	7	23
		25-4011	Archivists	0.01	15	18	49
		25-4012	Curators	0.01	15	18	49
2207.00	Political Science	11-9199	Managers, All Other	0.02	35	43	79
		11-1031	Legislators	0.12	25	31	70
		13-1041	Compliance Officers	0.15	27	36	76
		13-1075	Labor Relations Specialists	0.17	30	38	82
		19-2041	Environmental Scientists & Specialists, Including Health	0.14	0	0	52
		19-3094	Political Scientists	0.17	9	11	47
		25-1099	Postsecondary Teachers	0.01	4	7	23



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
2208.00	Sociology	27-3031	Public Relations Specialists	0.19	13	17	74
		11-9199	Managers, All Other	0.04	35	43	79
		13-1041	Compliance Officers	0.26	27	36	76
		13-1075	Labor Relations Specialists	0.29	30	38	82
		19-2041	Environmental Scientists & Specialists, Including Health	0.24	0	0	52
		19-3041	Sociologists	0.18	9	11	47
		19-3093	Historians	0.45	9	11	47
		19-4061	Social Science Research Assistants	0.16	39	53	85
957.20	Construction Inspection	25-1099	Postsecondary Teachers	0.01	4	7	23
		13-1199	Business Operations Specialists, All Other	0.00	27	34	75
		47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	0.01	81	89	98
952.00	Construction Crafts Technology	47-4011	Construction & Building Inspectors	0.00	57	72	94
		11-9021	Construction Managers	0.00	57	65	93
		13-1051	Cost Estimators	0.00	54	65	95
		13-1199	Business Operations Specialists, All Other	0.00	27	34	75
		17-3022	Civil Engineering Technicians	0.10	57	80	97
		25-2032	Career/Technical Education Teachers, Secondary School	0.13	3	5	46
		47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	0.03	81	89	98
		47-2031	Carpenters	1.00	88	93	99
		47-2041	Carpet Installers	1.00	93	97	100
		47-2042	Floor Layers, Except Carpet, Wood, & Hard Tiles	1.00	93	97	100
		47-2043	Floor Sanders & Finishers	1.00	93	97	100
		47-2044	Tile & Marble Setters	1.00	93	97	100
		47-2051	Cement Masons & Concrete Finishers	1.00	95	96	99
		47-2053	Terrazzo Workers & Finishers	1.00	95	96	99
		47-2061	Construction Laborers	1.00	90	94	99



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
934.00	Electronics and Electric Technology	47-2073	Operating Engineers & Other Construction Equipment Operators	0.18	92	97	100
		47-2081	Drywall & Ceiling Tile Installers	1.00	96	98	100
		47-2121	Glaziers	1.00	91	96	99
		47-2131	Insulation Workers, Floor, Ceiling, & Wall	1.00	90	98	100
		47-2132	Insulation Workers, Mechanical	1.00	90	98	100
		47-2141	Painters, Construction & Maintenance	1.00	90	94	99
		47-2142	Paperhangers	1.00	90	94	99
		47-2181	Roofers	1.00	95	97	100
		47-2211	Sheet Metal Workers	0.01	87	95	99
		47-4011	Construction & Building Inspectors	0.01	57	72	94
		49-9071	Maintenance & Repair Workers, General	0.01	82	93	99
		49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	0.06	72	86	98
		49-2011	Computer, Automated Teller, & Office Machine Repairers	0.40	52	72	96
		49-2021	Radio, Cellular, & Tower Equipment Installers & Repairs	1.00	68	84	98
		49-2092	Electric Motor, Power Tool, & Related Repairers	1.00	75	92	99
		49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment	0.06	62	83	98
		49-2095	Electrical & Electronics Repairers, Powerhouse, Substation, & Relay	1.00	62	83	98
		49-2097	Electronic Home Entertainment Equipment Installers & Repairers	1.00	74	86	98
		49-9031	Home Appliance Repairers	0.09	82	93	99
		49-9061	Camera & Photographic Equipment Repairers	1.00	56	77	95
		49-9071	Maintenance & Repair Workers, General	0.04	82	93	99
		49-9097	Signal & Track Switch Repairers	0.61	80	90	98
		49-9099	Installation, Maintenance, & Repair Workers, All Other	0.66	80	90	98
934.20	Industrial Electronics	51-2021	Coil Winders, Tapers, & Finishers	1.00	85	94	99
		17-3023	Electrical & Electronics Engineering Technicians	0.35	57	80	97
		17-3024	Electro-Mechanical Technicians	0.16	57	80	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
949.00	Automotive Collision Repair	17-3026	Industrial Engineering Technicians	0.06	57	80	97
		17-3029	Engineering Technicians, Except Drafters, All Other	0.05	57	80	97
		49-2011	Computer, Automated Teller, & Office Machine Repairers	0.18	52	72	96
		49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment	0.03	62	83	98
		49-9041	Industrial Machinery Mechanics	0.07	80	94	99
		49-9071	Maintenance & Repair Workers, General	0.02	82	93	99
		51-9141	Semiconductor Processors	1.00	87	93	99
		13-1032	Insurance Appraisers, Auto Damage	1.00	40	50	91
		49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	0.01	72	86	98
		49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment	0.04	62	83	98
		49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	0.03	76	91	99
		49-3021	Automotive Body & Related Repairers	0.04	90	97	100
		49-3022	Automotive Glass Installers & Repairers	0.05	94	97	99
		49-3023	Automotive Service Technicians & Mechanics	0.03	84	96	99
		948.00	Automotive Technology	49-3093	Tire Repairers & Changers	0.03	88
49-9071	Maintenance & Repair Workers, General			0.01	82	93	99
51-9122	Painters, Transportation Equipment			0.15	91	95	99
53-6051	Transportation Inspectors			0.02	69	83	97
17-3027	Mechanical Engineering Technicians			0.68	57	80	97
49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers			0.15	72	86	98
49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment			0.67	62	83	98
49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles			0.56	76	91	99
49-3021	Automotive Body & Related Repairers			0.74	90	97	100
49-3022	Automotive Glass Installers & Repairers			0.95	94	97	99



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		49-3023	Automotive Service Technicians & Mechanics	0.56	84	96	99
		49-3093	Tire Repairers & Changers	0.56	88	94	99
		49-9071	Maintenance & Repair Workers, General	0.12	82	93	99
		53-6051	Transportation Inspectors	0.40	69	83	97
		53-7061	Cleaners of Vehicles & Equipment	1.00	91	95	99
*934.10	Computer Electronics	15-1151	Computer User Support Specialists	0.02	35	51	88
		49-2011	Computer, Automated Teller, & Office Machine Repairers	0.04	52	72	96
		49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment	0.01	62	83	98
*946.00	Environmental Control Technology	49-9021	Heating, Air Conditioning, & Refrigeration Mechanics & Installers	0.00	80	94	99
		49-9031	Home Appliance Repairers	0.00	82	93	99
		49-9071	Maintenance & Repair Workers, General	0.00	82	93	99
		49-9098	Helpers--Installation, Maintenance, & Repair Workers	0.00	84	92	99
*949.00	Automotive Collision Repair	49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	0.16	76	91	99
		49-3021	Automotive Body & Related Repairers	0.22	90	97	100
		49-3023	Automotive Service Technicians & Mechanics	0.16	84	96	99
		49-3093	Tire Repairers & Changers	0.16	88	94	99
		49-9071	Maintenance & Repair Workers, General	0.03	82	93	99
		51-9122	Painters, Transportation Equipment	0.85	91	95	99
		53-6051	Transportation Inspectors	0.12	69	83	97
*948.00	Automotive Technology	49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment	0.30	62	83	98
		49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	0.25	76	91	99
		49-3023	Automotive Service Technicians & Mechanics	0.25	84	96	99
		49-3093	Tire Repairers & Changers	0.25	88	94	99
		49-9071	Maintenance & Repair Workers, General	0.05	82	93	99
		53-6051	Transportation Inspectors	0.18	69	83	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
956.50	Welding Technology	47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	0.34	81	89	98
		47-2152	Plumbers, Pipefitters, & Steamfitters	0.18	88	95	99
		47-2171	Reinforcing Iron & Rebar Workers	1.00	94	97	99
		47-2211	Sheet Metal Workers	0.16	87	95	99
		47-2221	Structural Iron & Steel Workers	1.00	87	95	99
		49-9071	Maintenance & Repair Workers, General	0.09	82	93	99
		51-4121	Welders, Cutters, Solderers, & Brazers	1.00	89	97	100
		51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	0.85	89	97	100
1008.00	Dance	25-1099	Postsecondary Teachers	0.00	4	7	23
		25-3021	Self-Enrichment Education Teachers	0.01	30	39	75
		27-2031	Dancers	0.07	58	65	93
		27-2032	Choreographers	0.07	58	65	93
1030.00	Graphic Art and Design	15-1134	Web Developers	0.37	21	31	85
		25-1099	Postsecondary Teachers	0.01	4	7	23
		27-1011	Art Directors	0.28	33	41	87
		27-1014	Multimedia Artists & Animators	0.26	33	41	87
		27-1019	Artists & Related Workers, All Other	0.94	33	41	87
		27-1024	Graphic Designers	0.26	29	41	89
		43-9031	Desktop Publishers	0.30	49	62	91
1007.00	Dramatic Arts	25-1099	Postsecondary Teachers	0.00	4	7	23
		27-1022	Fashion Designers	0.77	29	41	89
		27-1027	Set & Exhibit Designers	0.18	29	41	89
		27-2011	Actors	0.93	30	39	87
		27-2012	Producers & Directors	0.54	19	24	84
		27-2031	Dancers	0.86	58	65	93
		27-2032	Choreographers	0.86	58	65	93
		27-2042	Musicians & Singers	0.32	38	43	75
		27-2099	Entertainers & Performers, Sports & Related Workers, All Other	1.00	54	60	91



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
1006.00	Technical Theater	27-3043	Writers & Authors	0.06	14	17	68
		27-4014	Sound Engineering Technicians	0.33	49	65	96
		39-3092	Costume Attendants	0.93	66	74	94
		39-5091	Makeup Artists, Theatrical & Performance	0.07	81	89	98
		25-1099	Postsecondary Teachers	0.00	4	7	23
		27-1027	Set & Exhibit Designers	0.01	29	41	89
		27-2012	Producers & Directors	0.04	19	24	84
		27-4014	Sound Engineering Technicians	0.02	49	65	96
1002.00	Art	39-3092	Costume Attendants	0.07	66	74	94
		39-5091	Makeup Artists, Theatrical & Performance	0.01	81	89	98
		25-1099	Postsecondary Teachers	0.01	4	7	23
		25-2021	Elementary School Teachers, Except Special Education	0.21	3	5	49
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.14	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.08	3	5	46
		25-3021	Self-Enrichment Education Teachers	0.73	30	39	75
		25-4011	Archivists	0.50	15	18	49
		25-4012	Curators	0.46	15	18	49
		25-4013	Museum Technicians & Conservators	0.37	15	18	49
		27-1011	Art Directors	0.69	33	41	87
		27-1012	Craft Artists	0.98	33	41	87
		27-1013	Fine Artists, Including Painters, Sculptors, & Illustrators	0.97	33	41	87
		27-1014	Multimedia Artists & Animators	0.64	33	41	87
		27-1021	Commercial & Industrial Designers	0.84	29	41	89
		27-1024	Graphic Designers	0.64	29	41	89
		27-1027	Set & Exhibit Designers	0.79	29	41	89
27-4021	Photographers	0.79	38	49	91		
29-1125	Recreational Therapists	0.28	13	21	86		
51-9071	Jewelers & Precious Stone & Metal Workers	0.99	66	75	95		



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
1004.00	Music	51-9194	Etchers & Engravers	0.99	74	83	97
		25-2021	Elementary School Teachers, Except Special Education	0.09	3	5	49
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.06	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.04	3	5	46
		27-2041	Music Directors & Composers	0.84	38	43	75
		27-2042	Musicians & Singers	0.58	38	43	75
		27-4011	Audio & Video Equipment Technicians	0.65	49	65	96
		27-4014	Sound Engineering Technicians	0.60	49	65	96
		29-1125	Recreational Therapists	0.12	13	21	86
		49-9063	Musical Instrument Repairers & Tuners	1.00	56	77	95
*1004.00	Music	27-2041	Music Directors & Composers	0.07	38	43	75
		27-2042	Musicians & Singers	0.05	38	43	75
1240.20	Dental Hygienist	25-1099	Postsecondary Teachers	0.01	4	7	23
		29-2021	Dental Hygienists	0.24	11	62	95
1223.00	Health Information Technology	15-1121	Computer Systems Analysts	0.03	19	26	74
		15-1151	Computer User Support Specialists	0.03	35	51	88
		15-1152	Computer Network Support Specialists	0.02	35	51	88
		29-2071	Medical Records & Health Information Technicians	0.01	54	77	95
		43-6013	Medical Secretaries	0.00	62	77	96
1223.10	Health Information Coding	43-9021	Data Entry Keyers	0.01	62	75	96
		29-2071	Medical Records & Health Information Technicians	0.11	54	77	95
		31-9092	Medical Assistants	0.04	62	88	97
		43-3021	Billing & Posting Clerks	0.18	66	81	96
		43-6013	Medical Secretaries	0.04	62	77	96
514.20	Medical Office Technology	43-9021	Data Entry Keyers	0.08	62	75	96
		43-9041	Insurance Claims & Policy Processing Clerks	0.18	59	71	96
		29-2071	Medical Records & Health Information Technicians	0.13	54	77	95
		31-9092	Medical Assistants	0.04	62	88	97



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		31-9094	Medical Transcriptionists	0.16	62	82	97
		43-1011	First-Line Supervisors of Office & Administrative Support Workers	0.06	53	65	91
		43-3021	Billing & Posting Clerks	0.22	66	81	96
		43-4071	File Clerks	0.12	64	77	95
		43-4171	Receptionists & Information Clerks	0.11	71	84	97
		43-6011	Executive Secretaries & Executive Administrative Assistants	0.06	62	77	96
		43-6013	Medical Secretaries	0.04	62	77	96
		43-9021	Data Entry Keyers	0.09	62	75	96
		43-9041	Insurance Claims & Policy Processing Clerks	0.22	59	71	96
		43-9061	Office Clerks, General	0.05	64	77	96
1208.00	Medical Assisting	31-9092	Medical Assistants	0.69	62	88	97
		43-6013	Medical Secretaries	0.68	62	77	96
1250.00	Emergency Medical Services	11-9111	Medical & Health Services Managers	0.04	25	37	68
		11-9161	Emergency Management Directors	0.06	26	37	77
		25-1099	Postsecondary Teachers	0.01	4	7	23
		29-2041	Emergency Medical Technicians & Paramedics	0.15	57	80	97
		31-1014	Nursing Assistants	0.08	80	91	98
		33-1021	First-Line Supervisors of Fire Fighting & Prevention Workers	0.18	49	70	94
		33-2011	Firefighters	0.19	54	77	97
		33-9092	Lifeguards, Ski Patrol, & Other Recreational Protective Service Workers	0.48	48	60	93
		43-5031	Police, Fire, & Ambulance Dispatchers	0.18	72	83	98
		53-3011	Ambulance Drivers & Attendants, Except Emergency Medical Technicians	1.00	81	87	96
1210.00	Respiratory Care/Therapy	25-1099	Postsecondary Teachers	0.02	4	7	23
		29-1126	Respiratory Therapists	0.47	14	69	96
		29-2054	Respiratory Therapy Technicians	0.47	57	78	96
1217.00	Surgical Technician	25-1099	Postsecondary Teachers	0.00	4	7	23



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					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		29-2055	Surgical Technologists	0.14	57	78	96
		29-2099	Health Technologists & Technicians, All Other	0.12	52	69	91
		31-9093	Medical Equipment Preparers	0.14	74	86	97
1225.00	Radiologic Technology	29-2034	Radiologic Technologists	0.09	25	68	94
		29-2099	Health Technologists & Technicians, All Other	0.08	52	69	91
2104.40	Alcohol and Controlled Substances	21-1011	Substance Abuse & Behavioral Disorder Counselors	0.06	15	20	45
		21-1014	Mental Health Counselors	0.08	15	20	45
		21-1023	Mental Health & Substance Abuse Social Workers	0.06	16	22	63
		21-1093	Social & Human Service Assistants	0.05	43	54	85
1230.00	Nursing	11-9111	Medical & Health Services Managers	0.68	25	37	68
		25-1099	Postsecondary Teachers	0.08	4	7	23
		29-1141	Registered Nurses	0.96	6	39	89
		29-1151	Nurse Anesthetists	1.00	2	2	14
		29-1161	Nurse Midwives	1.00	1	1	7
		29-1171	Nurse Practitioners	0.96	1	1	7
*1306.60	Dietetic Technology	29-2051	Dietetic Technicians	0.00	57	78	96
505.00	Business Administration	11-2022	Sales Managers	0.91	24	31	81
		11-3011	Administrative Services Managers	0.86	46	58	88
		11-3051	Industrial Production Managers	0.91	48	56	87
		11-3061	Purchasing Managers	0.94	31	39	78
		11-3071	Transportation, Storage, & Distribution Managers	0.90	62	71	93
		11-9021	Construction Managers	0.89	57	65	93
		11-9151	Social & Community Service Managers	0.63	22	28	66
		11-9199	Managers, All Other	0.34	35	43	79
		11-1011	Chief Executives	0.88	25	31	70
		11-1021	General & Operations Managers	0.87	45	55	88
		13-1011	Agents & Business Managers of Artists, Performers, & Athletes	0.92	36	42	85
		13-1051	Cost Estimators	0.81	54	65	95



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		13-1111	Management Analysts	0.91	17	22	64
		13-1199	Business Operations Specialists, All Other	0.55	27	34	75
		15-1199	Computer Occupations, All Other	0.68	29	44	83
		25-1099	Postsecondary Teachers	0.12	4	7	23
		43-1011	First-Line Supervisors of Office & Administrative Support Workers	0.56	53	65	91
		43-6011	Executive Secretaries & Executive Administrative Assistants	0.62	62	77	96
		43-9061	Office Clerks, General	0.49	64	77	96
506.50	Retail Store Operations and Management	11-1021	General & Operations Managers	0.01	45	55	88
		13-1022	Wholesale & Retail Buyers, Except Farm Products	0.66	54	63	95
		13-1199	Business Operations Specialists, All Other	0.01	27	34	75
		41-1011	First-Line Supervisors of Retail Sales Workers	0.79	64	74	95
502.00	Accounting	13-2011	Accountants & Auditors	0.66	12	21	76
		13-2082	Tax Preparers	0.66	34	44	79
		43-3031	Bookkeeping, Accounting, & Auditing Clerks	0.18	69	80	97
		43-3051	Payroll & Timekeeping Clerks	0.18	64	78	97
		43-4011	Brokerage Clerks	0.63	48	55	91
		43-9111	Statistical Assistants	0.29	59	70	91
514.00	Office Technology/Office Computer Applications	43-4071	File Clerks	0.12	64	77	95
		43-4171	Receptionists & Information Clerks	0.12	71	84	97
		43-6011	Executive Secretaries & Executive Administrative Assistants	0.07	62	77	96
		43-6014	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	0.25	62	77	96
		43-9021	Data Entry Keyers	0.10	62	75	96
		43-9022	Word Processors & Typists	0.23	63	77	95
		43-9061	Office Clerks, General	0.06	64	77	96
511.00	Real Estate	11-9141	Property, Real Estate, & Community Association Managers	1.00	49	58	89



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
509.00	Marketing and Distribution	13-2021	Appraisers & Assessors of Real Estate	1.00	37	46	89
		41-9021	Real Estate Brokers	1.00	40	50	88
		41-9022	Real Estate Sales Agents	0.29	40	50	88
		11-2022	Sales Managers	0.00	24	31	81
		13-1022	Wholesale & Retail Buyers, Except Farm Products	0.13	54	63	95
		13-1023	Purchasing Agents, Except Wholesale, Retail, & Farm Products	1.00	43	54	90
		13-1161	Market Research Analysts & Marketing Specialists	0.07	14	19	74
		41-1011	First-Line Supervisors of Retail Sales Workers	0.16	64	74	95
		41-1012	First-Line Supervisors of Non-Retail Sales Workers	1.00	48	57	88
		41-3011	Advertising Sales Agents	1.00	31	39	90
		41-3021	Insurance Sales Agents	1.00	43	53	92
		41-3031	Securities, Commodities, & Financial Services Sales Agents	1.00	23	29	81
		41-4011	Sales Representatives, Wholesale & Manufacturing, Technical & Scientific Products	1.00	43	51	92
		41-4012	Sales Representatives, Wholesale & Manufacturing, Except Technical & Scientific Products	1.00	43	51	92
		41-9022	Real Estate Sales Agents	0.62	40	50	88
		41-9031	Sales Engineers	1.00	20	29	86
		41-9041	Telemarketers	1.00	70	80	97
		*506.00	Business Management	41-9091	Door-to-Door Sales Workers, News & Street Vendors, & Related Workers	1.00	66
53-3031	Driver/Sales Workers			0.01	87	94	99
13-1199	Business Operations Specialists, All Other			0.03	27	34	75
15-1199	Computer Occupations, All Other			0.04	29	44	83
43-1011	First-Line Supervisors of Office & Administrative Support Workers			0.03	53	65	91
43-6011	Executive Secretaries & Executive Administrative Assistants			0.04	62	77	96
43-9061	Office Clerks, General			0.03	64	77	96



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
*506.50	Retail Store Operations and Management	13-1022	Wholesale & Retail Buyers, Except Farm Products	0.02	54	63	95
		33-9099	Protective Service Workers, All Other	0.01	48	60	93
		41-1011	First-Line Supervisors of Retail Sales Workers	0.02	64	74	95
		41-2031	Retail Salespersons	1.00	64	75	96
		43-5081	Stock Clerks & Order Fillers	0.00	82	89	98
*502.00	Accounting	43-3031	Bookkeeping, Accounting, & Auditing Clerks	0.00	69	80	97
		43-3051	Payroll & Timekeeping Clerks	0.00	64	78	97
		43-4011	Brokerage Clerks	0.00	48	55	91
*514.00	Office Technology/Office Computer Applications	43-4071	File Clerks	0.07	64	77	95
		43-4171	Receptionists & Information Clerks	0.07	71	84	97
		43-6014	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	0.15	62	77	96
		43-9021	Data Entry Keyers	0.06	62	75	96
		43-9022	Word Processors & Typists	0.14	63	77	95
		43-9061	Office Clerks, General	0.03	64	77	96
*956.00	Manufacturing and Industrial Technology	43-5061	Production, Planning, & Expediting Clerks	0.07	52	65	91
		43-5071	Shipping, Receiving, & Traffic Clerks	0.07	82	91	99
		43-5081	Stock Clerks & Order Fillers	0.07	82	89	98
		47-2073	Operating Engineers & Other Construction Equipment Operators	0.65	92	97	100
		53-1031	First-Line Supervisors of Transportation & Material-Moving Machine & Vehicle Operators	0.79	71	81	97
		53-7062	Laborers & Freight, Stock, & Material Movers, Hand	1.00	88	93	99
		53-7121	Tank Car, Truck, & Ship Loaders	1.00	87	94	99
*511.00	Real Estate	41-9022	Real Estate Sales Agents	0.08	40	50	88
2205.00	History	11-9199	Managers, All Other	0.04	35	43	79
		19-3091	Anthropologists & Archeologists	0.30	9	11	47
		19-3093	Historians	0.41	9	11	47
		19-3094	Political Scientists	0.27	9	11	47



TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	PROGRAM BASED WEIGHT	% OF WORKFORCE WITH GIVEN EDUCATION LEVEL AND BELOW		
					CERTIFICATE OR SOME COLLEGE	ASSOCIATE DEGREE	BACHELOR'S DEGREE
		25-1099	Postsecondary Teachers	0.01	4	7	23
		25-2022	Middle School Teachers, Except Special & Career/ Technical Education	0.11	3	5	49
		25-2031	Secondary School Teachers, Except Special & Career/ Technical Education	0.07	3	5	46
		25-4011	Archivists	0.42	15	18	49

Source: Emsi program demand gap model.

*Denotes non-credit program.



APPENDIX 4: PROGRAM DEMAND GAP ANALYSIS METHODOLOGY

This appendix focuses on describing and understanding the methodology used in the program demand gap analysis. This requires data on both occupation demand (e.g., annual job openings) and education supply (e.g., number of postsecondary degree completions). These are then compared through an education “gap” analysis to determine whether an education program is potentially producing a surplus or shortage of workforce talent relative to the number of job openings. In this way, it is possible to see how the institution’s current programs are satisfying regional workforce needs.

SUPPLY AND DEMAND MODEL

Emsi builds a model using demand-side data (average annual openings) and supply-side data (postsecondary education output) to compare workforce demand with education supply. The purpose of this analysis is to find the difference or “gap” between the average annual openings for an occupation and the number of people completing postsecondary degrees for that occupation, whether at FCC or at another educational institution within the region. This makes it possible to identify whether there may be talent shortages or surpluses within the FCC Service Region.

The first step involves mapping the linkage between annual openings for a SOC code and the number of completions for an education program TOP code. The BLS provides information on the occupations that completers of specific TOP codes are more likely to enter. Specific connections have been refined through previous engagements with educational institutions and state departments of labor. Some programs have direct occupational ties. For example,

a physical therapist assistant is a specific occupation that requires specialized postsecondary training. In this case, one TOP code (physical therapy technician/assistant) maps to only one SOC code (physical therapist assistants). This provides an easy comparison of annual openings for physical therapist assistants to the number of people completing the relevant program to see whether a talent shortage or surplus exists. Unfortunately, this is not always the case. More often than not an educational program maps to multiple occupations and an occupation maps to multiple educational programs. For this reason, Emsi has pioneered a method of de-duplicating job openings, such that the potential sources of demand are not double-represented for any occupation. The details of this process are outlined in this chapter, under “De-duplication of Annual Openings.”

OCCUPATION DEMAND

Educational Level Adjustments

To capture occupation demand, Emsi uses a proprietary employment dataset that reflects total employment. Emsi uses the QCEW data source, which measures employment covered by unemployment insurance (UI). According to the BLS, “employment covered by these UI programs represents about 97% of all wage and salary civilian employment in the country”. Further through a proprietary process, Emsi removed the BLS local area employment suppressions to yield the best employment data available at local levels. The employment data reflects jobs for January 2018. Within this dataset, Emsi calculates the number of regional annual job openings for the



occupations that require different entry levels of education.¹⁵ The BLS also provides educational attainment data of current workers for each SOC code, broken out by their highest level of education attained. The data is presented as the percentage of workers in the SOC code with educational attainment ranging from less than a high school degree to a bachelor’s degree. Using these data, Emsi adjusts the annual opening estimates for each SOC code to only incorporate the percentage of workers that correspond with FCC’s program offerings.

For example, as shown in Table A4.1, there are three occupations trained for by Corrections (TOP code 43.0102). Within that cluster are an assortment of career fields, including correctional officers and jailers, first-line supervisors of police and detectives, and first-line supervisors of correctional officers. Among correctional officers, the majority of job openings (75%) are available to somebody with “some college” or a certificate. Alternatively, for first-line supervisors of police and detectives, only 46% of job openings are accessible to a person without a college degree. The weighted average of job openings is calculated for each program at each program/degree level where FCC has produced completers over the past three years.

¹⁵ See Appendix 1 for a description of the sources and processes of Emsi data.

Not taking into account the educational attainment dynamics in this way would bias the result by over-counting potential job opportunities for completers.¹⁶

De-duplication of Annual Openings

Most educational programs are designed to train people for multiple occupational types, many of which are simultaneously linked with other educational programs. This presents a complexity when comparing supply and demand for any particular educational program. For instance, the Computer Systems Networking & Telecommunications program is mapped to three different occupations: computer support specialists, information security analysts, and computer systems analysts. If we focus on just one of the occupations for this list—computer support specialists—it is also mapped to 10 different educational programs, spanning program titles such as Computer Systems Analysis and Medical Office Computer Specialist.

To ensure that no double-counting occurs, it is necessary to either realign the program groupings to eliminate the mapping of occu-

¹⁶ Given the changing dynamics and need for more education in the existing workforce (i.e., skills-biased technology change in many occupations and industry sectors), this assumption is considered conservative.

TABLE A4.1: Educational Level Adjustments

TOP CODE	TOP TITLE	SOC CODE	SOC TITLE	SOME COLLEGE, CERTIFICATE, OR BELOW	ASSOCIATE DEGREE OR BELOW
2105.10	Corrections	33-3012	Correctional Officers and Jailers	75%	88%
		33-1012	First-Line Supervisors of Police and Detectives	46%	62%
		33-1011	First-Line Supervisors of Correctional Officers	61%	75%
Weighted Average				68%	85%



pations to multiple programs or to determine what proportion of demand should be compared with supply numbers from each program. Emsi takes the second approach in this analysis, which has the advantage of maintaining the program titles and descriptions in roughly the same format that completer data were originally delivered to Emsi. Emsi uses a formula that favors program types with the largest number of completers, attributing a greater proportion of demand to these than the programs which produce a smaller number of completers. This method utilizes the assumption that the higher output educational programs are likely feeding a higher degree of demand within the Economic Region.¹⁷ Appendix 3 contains the detailed mapping of each TOP code to all relevant occupations.

Emsi uses a methodology that allocates jobs on a proportional basis according to the number of program completers. For example, in a region where a unique program such as Commercial and Advertising Art is more prevalent than Graphic Design, it is assumed that the graduates of the Commercial and Advertising Art program will be offered a proportional, therefore a larger number of local openings than students from the Graphic Design program.

Emsi also provides an alternative program demand gap analysis, which does not de-duplicate the number of annual openings based on the size of each educational program. Rather the total number of annual openings available for students at each educational level for each program is provided without further modification. Due to this modification, these numbers have not been de-duplicated, unlike the annual openings figures shown in Chapter 3. This leads to

¹⁷ Note this adjustment is performed on a program-by-program basis without consideration of individual colleges or training providers. Therefore, a single program offered at one large institution has no advantage over a group of similar programs offered at several smaller educational providers given that the aggregate output of the smaller schools is near the output of the single larger school.

double counting the job openings and overstates the true number of jobs available to all students. While these figures have not been provided in this analysis, they are available upon request from Emsi.

EDUCATION OUTPUT

There are several educational institutions in the FCC Service Region, some of which have programs similar to those offered at FCC. Hence, completers at FCC will be competing for some jobs with completers from other regional institutions. Emsi determined education output by TOP codes and identified the number of completers for every award level within those TOP codes. To find the output for all public and private educational institutions in the FCC Service Region, Emsi uses data from the Integrated Postsecondary Educational System (IPEDS).¹⁸ These data are publicly available through the National Center for Educational Statistics. Completions data are averaged for a three-year period, 2014 through 2016, to smooth out any bumps in enrollment that may be unique to a particular academic year. Data gathered for FCC from IPEDS were reviewed for accuracy by FCC and updated with 2017 completers' data.

Tables A4.2, A4.3, and A4.4, on the next page, display the completion breakdown by institution in the FCC Service Region at the certificate, associate, and bachelor's degree levels, respectively. FCC is one of several institutions in the region. Using a three-year average, FCC grants 1,163 certificates and 2,050 (575 of which are at the associate degree for transfer level) associate degrees every year, which is 16% and 32% of the totals, respectively.

¹⁸ These data come with inherent weaknesses. Primarily, numbers are only available for institutions that participate in or are applicants for any federal financial assistance program authorized by the Higher Education Act (HEA). Also, IPEDS does not collect data on non-credit courses and programs. Nevertheless, this system is the best source for collecting information on a broad range of educational institutions.



TABLE A4.2: Summary of Certificate Level Regional Completions by Institution

INSTITUTION	3-YEAR AVERAGE	% OF TOTAL
Fresno City College	1,163	16%
San Joaquin Valley College-Visalia	971	14%
Institute of Technology	764	11%
College of the Sequoias	698	10%
UEI College-Fresno	583	8%
Reedley College	540	8%
Advanced Career Institute	387	5%
West Hills College-Coalinga	361	5%
Milan Institute-Visalia	334	5%
Milan Institute-Clovis	234	3%
West Hills College-Lemoore	220	3%
Brightwood College-Fresno	213	3%
Clovis Adult Education	178	2%
Paul Mitchell the School-Fresno	123	2%
Porterville College	110	2%
Milan Institute of Cosmetology-Visalia	83	1%
Lawrence & Company College of Cosmetology	64	1%
Estes Institute of Cosmetology Arts and Science	52	1%
Lyles Fresno College of Beauty	37	1%
Manchester Beauty College	10	0%
Madera Beauty College	8	0%
Clovis Community College	7	0%
Heald College-Fresno	6	0%
Tulare Beauty College	6	0%
Total	7,154	100%

Source: IPEDS.

TABLE A4.3: Summary of Associate Degree Regional Completions by Institution

INSTITUTION	3-YEAR AVERAGE	% OF TOTAL
San Joaquin Valley College-Visalia	2,050	32%
College of the Sequoias	1,138	18%
Reedley College	769	12%
Fresno City College	669	10%
West Hills College-Lemoore	502	8%
Porterville College	376	6%
Institute of Technology	267	4%
West Hills College-Coalinga	256	4%
Heald College-Fresno	226	3%
Clovis Community College	120	2%
ITT Technical Institute-Clovis	72	1%
Brightwood College-Fresno	21	0%
Sierra Valley College of Court Reporting	9	0%
California Christian College	2	0%
Total	6,474	100%

Source: IPEDS.

TABLE A4.4: Summary of Bachelor's Degree Regional Completions by Institution

INSTITUTION	3-YEAR AVERAGE	% OF TOTAL
California State University-Fresno	4,185	77%
Fresno Pacific University	662	12%
Fresno City College	575	11%
ITT Technical Institute-Clovis	29	1%
California Christian College	2	0%
Total	5,453	100%

Source: IPEDS.



APPENDIX 5: DETAILED EMPLOYMENT PROJECTIONS

TABLE A5.1: Detailed Employment Projections by Occupation, 2017 and 2027

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
11-1011	Chief Executives	1,080	1,134	54	5%	91
11-1021	General & Operations Managers	7,732	8,817	1,085	14%	843
11-1031	Legislators	150	156	6	4%	12
11-2011	Advertising & Promotions Managers	50	53	3	7%	6
11-2021	Marketing Managers	410	450	40	10%	44
11-2022	Sales Managers	1,779	1,903	124	7%	181
11-2031	Public Relations & Fundraising Managers	175	196	21	12%	18
11-3011	Administrative Services Managers	1,194	1,347	153	13%	127
11-3021	Computer & Information Systems Managers	497	594	97	19%	53
11-3031	Financial Managers	1,521	1,633	113	7%	138
11-3051	Industrial Production Managers	612	672	60	10%	55
11-3061	Purchasing Managers	194	203	8	4%	18
11-3071	Transportation, Storage, & Distribution Managers	560	598	38	7%	52
11-3111	Compensation & Benefits Managers	25	29	4	16%	3
11-3121	Human Resources Managers	488	532	45	9%	49
11-3131	Training & Development Managers	69	80	11	16%	8
11-9013	Farmers, Ranchers, & Other Agricultural Managers	7,748	6,477	(1,271)	(16%)	566
11-9021	Construction Managers	1,233	1,172	(61)	(5%)	93
11-9031	Education Administrators, Preschool & Childcare Center/Program	296	331	35	12%	29
11-9032	Education Administrators, Elementary & Secondary School	1,397	1,652	255	18%	151
11-9033	Education Administrators, Postsecondary	327	385	58	18%	35
11-9039	Education Administrators, All Other	148	163	15	10%	14
11-9041	Architectural & Engineering Managers	294	334	39	13%	28



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
11-9051	Food Service Managers	1,572	1,673	101	6%	203
11-9061	Funeral Service Managers	16	17	1	7%	1
11-9071	Gaming Managers	28	31	3	10%	4
11-9081	Lodging Managers	145	144	(1)	(1%)	17
11-9111	Medical & Health Services Managers	1,378	1,724	346	25%	166
11-9121	Natural Sciences Managers	95	103	8	9%	9
11-9131	Postmasters & Mail Superintendents	47	38	(10)	(21%)	3
11-9141	Property, Real Estate, & Community Association Managers	1,190	1,287	97	8%	112
11-9151	Social & Community Service Managers	901	1,148	246	27%	123
11-9161	Emergency Management Directors	28	33	4	15%	3
11-9199	Managers, All Other	2,483	2,786	303	12%	231
13-1011	Agents & Business Managers of Artists, Performers, & Athletes	33	32	(1)	(2%)	4
13-1021	Buyers & Purchasing Agents, Farm Products	133	143	9	7%	18
13-1022	Wholesale & Retail Buyers, Except Farm Products	378	401	23	6%	51
13-1023	Purchasing Agents, Except Wholesale, Retail, & Farm Products	682	746	64	9%	74
13-1031	Claims Adjusters, Examiners, & Investigators	1,122	1,187	65	6%	110
13-1032	Insurance Appraisers, Auto Damage	196	179	(17)	(9%)	17
13-1041	Compliance Officers	822	935	113	14%	87
13-1051	Cost Estimators	918	1,010	92	10%	111
13-1071	Human Resources Specialists	1,307	1,509	202	15%	169
13-1074	Farm Labor Contractors	64	81	17	26%	9
13-1075	Labor Relations Specialists	180	190	10	5%	20
13-1081	Logisticians	339	367	28	8%	40
13-1111	Management Analysts	2,080	2,306	226	11%	227
13-1121	Meeting, Convention, & Event Planners	185	239	54	29%	32
13-1131	Fundraisers	281	342	61	22%	40
13-1141	Compensation, Benefits, & Job Analysis Specialists	228	253	25	11%	24
13-1151	Training & Development Specialists	663	802	140	21%	92
13-1161	Market Research Analysts & Marketing Specialists	1,200	1,428	228	19%	161



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
13-1199	Business Operations Specialists, All Other	3,174	3,548	374	12%	369
13-2011	Accountants & Auditors	3,552	4,062	510	14%	418
13-2021	Appraisers & Assessors of Real Estate	237	239	3	1%	18
13-2031	Budget Analysts	162	176	14	9%	15
13-2041	Credit Analysts	120	118	(2)	(2%)	11
13-2051	Financial Analysts	322	365	43	13%	36
13-2052	Personal Financial Advisors	413	411	(3)	(1%)	36
13-2053	Insurance Underwriters	232	222	(10)	(4%)	20
13-2061	Financial Examiners	118	128	9	8%	11
13-2071	Credit Counselors	336	360	24	7%	33
13-2072	Loan Officers	775	734	(41)	(5%)	67
13-2081	Tax Examiners & Collectors, & Revenue Agents	1,488	1,438	(51)	(3%)	113
13-2082	Tax Preparers	409	412	2	1%	49
13-2099	Financial Specialists, All Other	345	369	24	7%	35
15-1111	Computer & Information Research Scientists	39	42	3	9%	3
15-1121	Computer Systems Analysts	845	1,049	204	24%	87
15-1122	Information Security Analysts	78	100	21	27%	9
15-1131	Computer Programmers	330	360	29	9%	27
15-1132	Software Developers, Applications	538	701	163	30%	60
15-1133	Software Developers, Systems Software	269	327	59	22%	27
15-1134	Web Developers	290	357	67	23%	31
15-1141	Database Administrators	145	180	36	25%	15
15-1142	Network & Computer Systems Administrators	822	942	119	14%	72
15-1143	Computer Network Architects	137	178	41	30%	15
15-1151	Computer User Support Specialists	1,674	1,951	278	17%	173
15-1152	Computer Network Support Specialists	392	465	73	19%	42
15-1199	Computer Occupations, All Other	553	600	47	9%	47
15-2011	Actuaries	20	27	7	38%	2
15-2021	Mathematicians	23	25	2	8%	2



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
15-2031	Operations Research Analysts	181	232	51	28%	18
15-2041	Statisticians	41	57	16	38%	6
15-2091	Mathematical Technicians	1	1	0	26%	0
15-2099	Mathematical Science Occupations, All Other	3	3	0	10%	0
17-1011	Architects, Except Landscape & Naval	198	201	3	1%	16
17-1012	Landscape Architects	91	96	5	5%	8
17-1021	Cartographers & Photogrammetrists	60	75	14	24%	7
17-1022	Surveyors	175	181	6	4%	14
17-2011	Aerospace Engineers	21	30	9	41%	3
17-2021	Agricultural Engineers	31	33	2	5%	2
17-2031	Biomedical Engineers	42	49	7	16%	4
17-2041	Chemical Engineers	21	25	4	22%	2
17-2051	Civil Engineers	1,057	1,230	173	16%	108
17-2061	Computer Hardware Engineers	47	58	11	23%	5
17-2071	Electrical Engineers	203	246	43	21%	20
17-2072	Electronics Engineers, Except Computer	115	152	37	32%	13
17-2081	Environmental Engineers	195	224	29	15%	18
17-2111	Health & Safety Engineers, Except Mining Safety Engineers & Inspectors	55	63	8	14%	5
17-2112	Industrial Engineers	257	314	57	22%	26
17-2121	Marine Engineers & Naval Architects	8	10	2	26%	1
17-2131	Materials Engineers	17	22	4	26%	2
17-2141	Mechanical Engineers	292	361	69	24%	29
17-2151	Mining & Geological Engineers, Including Mining Safety Engineers	15	17	2	13%	1
17-2161	Nuclear Engineers	17	18	1	8%	2
17-2171	Petroleum Engineers	29	37	8	27%	3
17-2199	Engineers, All Other	210	234	24	11%	18
17-3011	Architectural & Civil Drafters	335	349	14	4%	33
17-3012	Electrical & Electronics Drafters	43	51	8	18%	5
17-3013	Mechanical Drafters	83	94	11	13%	9



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
17-3019	Drafters, All Other	24	28	4	16%	3
17-3021	Aerospace Engineering & Operations Technicians	29	28	(1)	(3%)	3
17-3022	Civil Engineering Technicians	220	267	47	21%	28
17-3023	Electrical & Electronics Engineering Technicians	303	336	32	11%	33
17-3024	Electro-Mechanical Technicians	20	23	3	14%	2
17-3025	Environmental Engineering Technicians	42	50	8	18%	5
17-3026	Industrial Engineering Technicians	43	56	13	30%	6
17-3027	Mechanical Engineering Technicians	37	47	10	26%	5
17-3029	Engineering Technicians, Except Drafters, All Other	161	185	24	15%	19
17-3031	Surveying & Mapping Technicians	131	138	7	5%	17
19-1011	Animal Scientists	14	13	(1)	(6%)	2
19-1012	Food Scientists & Technologists	217	224	7	3%	25
19-1013	Soil & Plant Scientists	184	193	9	5%	22
19-1021	Biochemists & Biophysicists	23	26	3	11%	3
19-1022	Microbiologists	98	105	8	8%	10
19-1023	Zoologists & Wildlife Biologists	73	82	9	12%	8
19-1029	Biological Scientists, All Other	178	175	(3)	(2%)	17
19-1031	Conservation Scientists	98	104	7	7%	10
19-1032	Foresters	38	42	3	9%	4
19-1041	Epidemiologists	19	22	3	16%	2
19-1042	Medical Scientists, Except Epidemiologists	226	271	44	20%	27
19-1099	Life Scientists, All Other	8	11	3	33%	1
19-2011	Astronomers	3	3	(0)	(6%)	0
19-2012	Physicists	34	37	4	11%	3
19-2021	Atmospheric & Space Scientists	16	18	2	13%	2
19-2031	Chemists	154	178	24	16%	19
19-2032	Materials Scientists	7	7	(0)	(2%)	1
19-2041	Environmental Scientists & Specialists, Including Health	472	519	46	10%	54
19-2042	Geoscientists, Except Hydrologists & Geographers	68	75	7	11%	8



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
19-2043	Hydrologists	24	26	2	8%	3
19-2099	Physical Scientists, All Other	34	37	3	9%	3
19-3011	Economists	22	27	5	21%	2
19-3022	Survey Researchers	8	11	3	36%	1
19-3031	Clinical, Counseling, & School Psychologists	1,283	1,560	277	22%	128
19-3032	Industrial-Organizational Psychologists	2	2	(0)	(3%)	0
19-3039	Psychologists, All Other	113	128	15	13%	10
19-3041	Sociologists	11	12	0	3%	1
19-3051	Urban & Regional Planners	249	265	16	6%	24
19-3091	Anthropologists & Archeologists	21	21	(0)	(2%)	2
19-3092	Geographers	3	3	0	3%	0
19-3093	Historians	5	6	1	11%	1
19-3094	Political Scientists	5	6	1	23%	1
19-3099	Social Scientists & Related Workers, All Other	117	119	2	2%	12
19-4011	Agricultural & Food Science Technicians	446	462	16	4%	51
19-4021	Biological Technicians	258	278	20	8%	30
19-4031	Chemical Technicians	200	222	22	11%	24
19-4041	Geological & Petroleum Technicians	12	16	4	31%	2
19-4051	Nuclear Technicians	4	5	1	21%	1
19-4061	Social Science Research Assistants	22	27	5	20%	4
19-4091	Environmental Science & Protection Technicians, Including Health	182	194	12	7%	25
19-4092	Forensic Science Technicians	69	89	20	29%	12
19-4093	Forest & Conservation Technicians	476	427	(49)	(10%)	57
19-4099	Life, Physical, & Social Science Technicians, All Other	170	200	30	17%	27
21-1011	Substance Abuse & Behavioral Disorder Counselors	368	477	109	30%	59
21-1012	Educational, Guidance, School, & Vocational Counselors	1,602	1,850	248	15%	220
21-1013	Marriage & Family Therapists	659	766	106	16%	93
21-1014	Mental Health Counselors	674	889	215	32%	111
21-1015	Rehabilitation Counselors	681	864	183	27%	107



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
21-1019	Counselors, All Other	302	341	39	13%	41
21-1021	Child, Family, & School Social Workers	1,723	1,969	246	14%	234
21-1022	Healthcare Social Workers	642	920	278	43%	116
21-1023	Mental Health & Substance Abuse Social Workers	797	990	193	24%	119
21-1029	Social Workers, All Other	1,418	1,410	(8)	(1%)	161
21-1091	Health Educators	224	275	51	23%	38
21-1092	Probation Officers & Correctional Treatment Specialists	878	959	81	9%	95
21-1093	Social & Human Service Assistants	2,189	2,727	537	25%	374
21-1094	Community Health Workers	257	323	66	26%	45
21-1099	Community & Social Service Specialists, All Other	390	488	98	25%	68
21-2011	Clergy	968	1,106	138	14%	137
21-2021	Directors, Religious Activities & Education	590	622	33	6%	84
21-2099	Religious Workers, All Other	208	229	21	10%	34
23-1011	Lawyers	2,277	2,550	273	12%	137
23-1012	Judicial Law Clerks	135	138	3	2%	8
23-1021	Administrative Law Judges, Adjudicators, & Hearing Officers	128	137	8	7%	7
23-1022	Arbitrators, Mediators, & Conciliators	46	53	6	14%	3
23-1023	Judges, Magistrate Judges, & Magistrates	53	69	16	31%	4
23-2011	Paralegals & Legal Assistants	804	907	102	13%	105
23-2091	Court Reporters	105	115	10	10%	11
23-2093	Title Examiners, Abstractors, & Searchers	222	221	(0)	(0%)	20
23-2099	Legal Support Workers, All Other	217	230	13	6%	21
25-1099	Postsecondary Teachers, General	5,473	6,647	1,174	21%	622
25-2011	Preschool Teachers, Except Special Education	1,883	2,146	263	14%	241
25-2012	Kindergarten Teachers, Except Special Education	964	1,126	162	17%	128
25-2021	Elementary School Teachers, Except Special Education	7,785	9,219	1,434	18%	804
25-2022	Middle School Teachers, Except Special & Career/Technical Education	2,911	3,519	608	21%	311
25-2023	Career/Technical Education Teachers, Middle School	76	89	14	18%	8
25-2031	Secondary School Teachers, Except Special & Career/Technical Education	7,206	8,359	1,153	16%	702



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
25-2032	Career/Technical Education Teachers, Secondary School	271	326	55	20%	28
25-2051	Special Education Teachers, Preschool	147	192	45	31%	18
25-2052	Special Education Teachers, Kindergarten & Elementary School	957	1,147	190	20%	101
25-2053	Special Education Teachers, Middle School	391	474	83	21%	42
25-2054	Special Education Teachers, Secondary School	522	647	125	24%	58
25-2059	Special Education Teachers, All Other	178	221	42	24%	20
25-3011	Adult Basic & Secondary Education & Literacy Teachers & Instructors	836	955	120	14%	119
25-3021	Self-Enrichment Education Teachers	1,027	1,201	174	17%	151
25-3098	Substitute Teachers	6,085	6,909	824	14%	859
25-3099	Teachers & Instructors, All Other	2,000	2,233	233	12%	277
25-4011	Archivists	12	14	2	20%	2
25-4012	Curators	36	43	7	20%	5
25-4013	Museum Technicians & Conservators	42	49	6	15%	6
25-4021	Librarians	296	345	49	17%	38
25-4031	Library Technicians	541	594	53	10%	87
25-9011	Audio-Visual & Multimedia Collections Specialists	82	93	11	14%	10
25-9021	Farm & Home Management Advisors	34	39	5	14%	4
25-9031	Instructional Coordinators	985	1,115	130	13%	115
25-9041	Teacher Assistants	9,108	10,526	1,418	16%	1,241
25-9099	Education, Training, & Library Workers, All Other	586	660	74	13%	68
27-1011	Art Directors	139	145	5	4%	13
27-1012	Craft Artists	74	73	(1)	(2%)	6
27-1013	Fine Artists, Including Painters, Sculptors, & Illustrators	173	176	3	2%	16
27-1014	Multimedia Artists & Animators	84	89	5	6%	8
27-1019	Artists & Related Workers, All Other	39	39	0	1%	3
27-1021	Commercial & Industrial Designers	77	81	4	5%	8
27-1022	Fashion Designers	43	49	6	15%	5
27-1023	Floral Designers	197	196	(2)	(1%)	21
27-1024	Graphic Designers	681	682	1	0%	70

SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
27-1025	Interior Designers	200	197	(3)	(2%)	20
27-1026	Merchandise Displayers & Window Trimmers	350	367	17	5%	38
27-1027	Set & Exhibit Designers	20	23	3	16%	3
27-1029	Designers, All Other	18	19	2	10%	2
27-2011	Actors	73	79	6	9%	9
27-2012	Producers & Directors	265	306	41	16%	32
27-2021	Athletes & Sports Competitors	34	36	2	7%	5
27-2022	Coaches & Scouts	782	881	99	13%	131
27-2023	Umpires, Referees, & Other Sports Officials	70	76	6	9%	11
27-2031	Dancers	26	24	(2)	(9%)	4
27-2032	Choreographers	6	6	0	0%	1
27-2041	Music Directors & Composers	242	262	20	8%	29
27-2042	Musicians & Singers	502	530	28	6%	57
27-2099	Entertainers & Performers, Sports & Related Workers, All Other	91	95	4	5%	11
27-3011	Radio & Television Announcers	169	134	(34)	(20%)	16
27-3012	Public Address System & Other Announcers	38	37	(1)	(2%)	4
27-3021	Broadcast News Analysts	23	26	3	12%	3
27-3022	Reporters & Correspondents	165	173	8	5%	19
27-3031	Public Relations Specialists	480	549	69	14%	62
27-3041	Editors	281	316	35	13%	35
27-3042	Technical Writers	74	86	12	16%	9
27-3043	Writers & Authors	361	398	36	10%	39
27-3091	Interpreters & Translators	473	603	130	27%	66
27-3099	Media & Communication Workers, All Other	85	92	7	8%	9
27-4011	Audio & Video Equipment Technicians	284	330	46	16%	35
27-4012	Broadcast Technicians	163	175	11	7%	18
27-4013	Radio Operators	7	8	0	3%	1
27-4014	Sound Engineering Technicians	45	48	4	8%	5
27-4021	Photographers	342	371	28	8%	35



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
27-4031	Camera Operators, Television, Video, & Motion Picture	63	74	11	18%	8
27-4032	Film & Video Editors	72	89	17	24%	10
27-4099	Media & Communication Equipment Workers, All Other	64	63	(0)	(0%)	6
29-1011	Chiropractors	183	170	(13)	(7%)	6
29-1021	Dentists, General	786	882	97	12%	35
29-1022	Oral & Maxillofacial Surgeons	41	45	4	10%	2
29-1023	Orthodontists	25	28	3	12%	1
29-1024	Prosthodontists	28	31	3	11%	1
29-1029	Dentists, All Other Specialists	54	56	2	3%	2
29-1031	Dietitians & Nutritionists	357	441	83	23%	35
29-1041	Optometrists	123	163	40	32%	9
29-1051	Pharmacists	1,211	1,336	125	10%	72
29-1061	Anesthesiologists	155	180	26	17%	8
29-1062	Family & General Practitioners	576	648	72	12%	26
29-1063	Internists, General	181	208	27	15%	9
29-1064	Obstetricians & Gynecologists	70	84	14	20%	4
29-1065	Pediatricians, General	159	171	11	7%	7
29-1066	Psychiatrists	134	158	24	17%	7
29-1067	Surgeons	330	377	47	14%	15
29-1069	Physicians & Surgeons, All Other	1,296	1,519	223	17%	66
29-1071	Physician Assistants	522	693	171	33%	53
29-1081	Podiatrists	30	33	3	11%	2
29-1122	Occupational Therapists	434	575	141	33%	41
29-1123	Physical Therapists	812	1,072	261	32%	68
29-1124	Radiation Therapists	72	92	20	27%	6
29-1125	Recreational Therapists	109	128	19	18%	9
29-1126	Respiratory Therapists	602	732	130	22%	47
29-1127	Speech-Language Pathologists	764	943	179	23%	65
29-1128	Exercise Physiologists	35	40	5	15%	3



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
29-1129	Therapists, All Other	116	148	32	28%	11
29-1131	Veterinarians	263	289	26	10%	14
29-1141	Registered Nurses	11,935	15,114	3,179	27%	1,073
29-1151	Nurse Anesthetists	78	111	32	41%	8
29-1161	Nurse Midwives	40	49	9	23%	3
29-1171	Nurse Practitioners	770	1,060	290	38%	78
29-1181	Audiologists	47	63	16	34%	4
29-1199	Health Diagnosing & Treating Practitioners, All Other	127	147	20	16%	10
29-2011	Medical & Clinical Laboratory Technologists	386	512	126	33%	43
29-2012	Medical & Clinical Laboratory Technicians	474	622	148	31%	52
29-2021	Dental Hygienists	568	698	130	23%	54
29-2031	Cardiovascular Technologists & Technicians	233	304	71	31%	22
29-2032	Diagnostic Medical Sonographers	246	332	86	35%	25
29-2033	Nuclear Medicine Technologists	86	96	10	12%	6
29-2034	Radiologic Technologists	812	979	168	21%	68
29-2035	Magnetic Resonance Imaging Technologists	112	139	27	24%	10
29-2041	Emergency Medical Technicians & Paramedics	1,118	1,484	366	33%	122
29-2051	Dietetic Technicians	248	291	43	18%	27
29-2052	Pharmacy Technicians	1,583	1,807	223	14%	167
29-2053	Psychiatric Technicians	1,529	1,490	(40)	(3%)	137
29-2054	Respiratory Therapy Technicians	21	22	2	8%	2
29-2055	Surgical Technologists	414	535	120	29%	53
29-2056	Veterinary Technologists & Technicians	249	312	63	26%	30
29-2057	Ophthalmic Medical Technicians	253	313	60	24%	30
29-2061	Licensed Practical & Licensed Vocational Nurses	2,851	3,527	676	24%	316
29-2071	Medical Records & Health Information Technicians	921	1,113	192	21%	86
29-2081	Opticians, Dispensing	225	331	106	47%	32
29-2091	Orthotists & Prosthetists	16	20	4	25%	2
29-2092	Hearing Aid Specialists	15	24	9	59%	2



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
29-2099	Health Technologists & Technicians, All Other	909	1,201	292	32%	101
29-9011	Occupational Health & Safety Specialists	210	241	31	15%	16
29-9012	Occupational Health & Safety Technicians	58	68	10	17%	4
29-9091	Athletic Trainers	83	104	21	26%	7
29-9092	Genetic Counselors	11	14	3	29%	1
29-9099	Healthcare Practitioners & Technical Workers, All Other	208	244	37	18%	16
31-1011	Home Health Aides	1,302	2,618	1,316	101%	385
31-1013	Psychiatric Aides	119	195	76	64%	28
31-1014	Nursing Assistants	5,230	6,761	1,531	29%	897
31-1015	Orderlies	169	212	42	25%	28
31-2011	Occupational Therapy Assistants	56	96	40	72%	14
31-2012	Occupational Therapy Aides	28	36	8	27%	5
31-2021	Physical Therapist Assistants	153	238	85	55%	34
31-2022	Physical Therapist Aides	300	377	77	26%	52
31-9011	Massage Therapists	463	554	91	20%	66
31-9091	Dental Assistants	1,988	2,294	305	15%	286
31-9092	Medical Assistants	4,093	5,013	920	22%	624
31-9093	Medical Equipment Preparers	221	280	59	27%	40
31-9094	Medical Transcriptionists	197	216	19	10%	29
31-9095	Pharmacy Aides	379	384	5	1%	57
31-9096	Veterinary Assistants & Laboratory Animal Caretakers	273	312	39	14%	53
31-9097	Phlebotomists	576	729	153	27%	89
31-9099	Healthcare Support Workers, All Other	657	767	110	17%	107
33-1011	First-Line Supervisors of Correctional Officers	516	590	75	14%	48
33-1012	First-Line Supervisors of Police & Detectives	256	296	40	16%	22
33-1021	First-Line Supervisors of Fire Fighting & Prevention Workers	151	167	16	11%	13
33-1099	First-Line Supervisors of Protective Service Workers, All Other	231	242	12	5%	27
33-2011	Firefighters	1,088	1,187	100	9%	92
33-2021	Fire Inspectors & Investigators	45	50	5	10%	6



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
33-2022	Forest Fire Inspectors & Prevention Specialists	23	27	5	21%	3
33-3011	Bailiffs	6	13	7	120%	2
33-3012	Correctional Officers & Jailers	5,518	6,332	814	15%	609
33-3021	Detectives & Criminal Investigators	331	368	37	11%	28
33-3031	Fish & Game Wardens	53	65	12	22%	7
33-3041	Parking Enforcement Workers	28	27	(2)	(6%)	3
33-3051	Police & Sheriff's Patrol Officers	2,681	2,907	227	8%	218
33-3052	Transit & Railroad Police	21	23	2	8%	2
33-9011	Animal Control Workers	110	115	6	5%	14
33-9021	Private Detectives & Investigators	254	245	(9)	(4%)	27
33-9031	Gaming Surveillance Officers & Gaming Investigators	91	95	4	4%	14
33-9032	Security Guards	3,716	3,674	(43)	(1%)	535
33-9091	Crossing Guards	352	404	53	15%	80
33-9092	Lifeguards, Ski Patrol, & Other Recreational Protective Service Workers	269	306	37	14%	81
33-9093	Transportation Security Screeners	104	105	1	1%	10
33-9099	Protective Service Workers, All Other	743	839	96	13%	223
35-1011	Chefs & Head Cooks	506	593	87	17%	84
35-1012	First-Line Supervisors of Food Preparation & Serving Workers	3,639	4,380	741	20%	702
35-2011	Cooks, Fast Food	4,304	4,134	(170)	(4%)	653
35-2012	Cooks, Institution & Cafeteria	1,473	1,796	323	22%	286
35-2013	Cooks, Private Household	4	3	(1)	(24%)	1
35-2014	Cooks, Restaurant	3,529	4,185	656	19%	662
35-2015	Cooks, Short Order	571	603	32	6%	94
35-2019	Cooks, All Other	62	74	13	20%	12
35-2021	Food Preparation Workers	3,370	4,008	638	19%	751
35-3011	Bartenders	1,540	1,739	198	13%	316
35-3021	Combined Food Preparation & Serving Workers, Including Fast Food	16,690	20,422	3,732	22%	4,125
35-3022	Counter Attendants, Cafeteria, Food Concession, & Coffee Shop	1,751	2,130	380	22%	504
35-3031	Waiters & Waitresses	6,725	7,436	711	11%	1,542



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
35-3041	Food Servers, Nonrestaurant	561	749	188	34%	126
35-9011	Dining Room & Cafeteria Attendants & Bartender Helpers	1,403	1,586	183	13%	297
35-9021	Dishwashers	1,926	2,008	82	4%	344
35-9031	Hosts & Hostesses, Restaurant, Lounge, & Coffee Shop	1,258	1,394	136	11%	345
35-9099	Food Preparation & Serving Related Workers, All Other	441	505	64	14%	95
37-1011	First-Line Supervisors of Housekeeping & Janitorial Workers	891	1,021	130	15%	131
37-1012	First-Line Supervisors of Landscaping, Lawn Service, & Groundskeeping Workers	815	856	40	5%	91
37-2011	Janitors & Cleaners, Except Maids & Housekeeping Cleaners	10,091	11,577	1,486	15%	1,687
37-2012	Maids & Housekeeping Cleaners	4,471	4,423	(49)	(1%)	667
37-2019	Building Cleaning Workers, All Other	51	58	8	15%	9
37-2021	Pest Control Workers	499	532	33	7%	81
37-3011	Landscaping & Groundskeeping Workers	6,165	6,680	514	8%	890
37-3012	Pesticide Handlers, Sprayers, & Applicators, Vegetation	261	315	54	21%	43
37-3013	Tree Trimmers & Pruners	475	484	9	2%	65
37-3019	Grounds Maintenance Workers, All Other	110	115	5	5%	15
39-1011	Gaming Supervisors	145	165	20	14%	28
39-1012	Slot Supervisors	72	45	(27)	(37%)	10
39-1021	First-Line Supervisors of Personal Service Workers	590	762	172	29%	91
39-2011	Animal Trainers	441	435	(6)	(1%)	55
39-2021	Nonfarm Animal Caretakers	1,092	1,235	144	13%	207
39-3011	Gaming Dealers	901	974	73	8%	160
39-3012	Gaming & Sports Book Writers & Runners	39	44	4	11%	7
39-3019	Gaming Service Workers, All Other	209	228	18	9%	37
39-3021	Motion Picture Projectionists	6	7	1	14%	1
39-3031	Ushers, Lobby Attendants, & Ticket Takers	556	625	70	13%	167
39-3091	Amusement & Recreation Attendants	678	769	91	13%	189
39-3092	Costume Attendants	11	12	0	3%	3
39-3093	Locker Room, Coatroom, & Dressing Room Attendants	24	29	5	19%	7
39-3099	Entertainment Attendants & Related Workers, All Other	59	83	24	40%	20



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
39-4011	Embalmers	24	20	(4)	(16%)	4
39-4021	Funeral Attendants	207	220	13	6%	37
39-4031	Morticians, Undertakers, & Funeral Directors	47	53	6	12%	8
39-5011	Barbers	274	320	46	17%	34
39-5012	Hairdressers, Hairstylists, & Cosmetologists	2,549	2,956	406	16%	398
39-5091	Makeup Artists, Theatrical & Performance	11	12	1	12%	2
39-5092	Manicurists & Pedicurists	799	942	143	18%	122
39-5093	Shampooers	50	63	13	26%	8
39-5094	Skincare Specialists	247	298	51	21%	39
39-6011	Baggage Porters & Bellhops	49	56	7	14%	9
39-6012	Concierges	36	48	12	33%	8
39-7011	Tour Guides & Escorts	175	199	24	14%	38
39-7012	Travel Guides	15	16	1	10%	3
39-9011	Childcare Workers	6,080	5,700	(379)	(6%)	943
39-9021	Personal Care Aides	6,363	10,926	4,563	72%	1,858
39-9031	Fitness Trainers & Aerobics Instructors	903	972	69	8%	179
39-9032	Recreation Workers	1,783	2,083	299	17%	385
39-9041	Residential Advisors	418	541	122	29%	101
39-9099	Personal Care & Service Workers, All Other	287	334	47	16%	54
41-1011	First-Line Supervisors of Retail Sales Workers	5,956	6,551	595	10%	806
41-1012	First-Line Supervisors of Non-Retail Sales Workers	1,272	1,384	112	9%	142
41-2011	Cashiers	15,580	17,141	1,561	10%	3,531
41-2012	Gaming Change Persons & Booth Cashiers	176	185	9	5%	38
41-2021	Counter & Rental Clerks	2,388	2,618	230	10%	372
41-2022	Parts Salespersons	1,599	1,799	200	13%	252
41-2031	Retail Salespersons	17,885	21,040	3,155	18%	3,409
41-3011	Advertising Sales Agents	300	271	(29)	(10%)	39
41-3021	Insurance Sales Agents	1,927	2,035	109	6%	225
41-3031	Securities, Commodities, & Financial Services Sales Agents	906	815	(90)	(10%)	87



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
41-3041	Travel Agents	111	122	10	9%	16
41-3099	Sales Representatives, Services, All Other	2,774	3,260	486	18%	445
41-4011	Sales Representatives, Wholesale & Manufacturing, Technical & Scientific Products	765	843	78	10%	97
41-4012	Sales Representatives, Wholesale & Manufacturing, Except Technical & Scientific Products	5,149	5,668	518	10%	653
41-9011	Demonstrators & Product Promoters	406	408	2	1%	77
41-9012	Models	28	30	3	9%	6
41-9021	Real Estate Brokers	432	448	16	4%	46
41-9022	Real Estate Sales Agents	1,326	1,373	47	4%	141
41-9031	Sales Engineers	64	81	17	26%	10
41-9041	Telemarketers	310	497	187	60%	90
41-9091	Door-To-Door Sales Workers, News & Street Vendors, & Related Workers	335	237	(98)	(29%)	32
41-9099	Sales & Related Workers, All Other	407	486	79	19%	72
43-1011	First-Line Supervisors of Office & Administrative Support Workers	5,387	6,259	873	16%	714
43-2011	Switchboard Operators, Including Answering Service	399	340	(59)	(15%)	53
43-2021	Telephone Operators	41	34	(7)	(17%)	6
43-2099	Communications Equipment Operators, All Other	26	31	5	18%	4
43-3011	Bill & Account Collectors	876	891	14	2%	102
43-3021	Billing & Posting Clerks	1,804	2,177	373	21%	254
43-3031	Bookkeeping, Accounting, & Auditing Clerks	7,359	7,311	(48)	(1%)	898
43-3041	Gaming Cage Workers	303	334	31	10%	57
43-3051	Payroll & Timekeeping Clerks	1,217	1,256	39	3%	138
43-3061	Procurement Clerks	303	310	7	2%	37
43-3071	Tellers	1,519	1,213	(306)	(20%)	169
43-3099	Financial Clerks, All Other	147	147	0	0%	17
43-4011	Brokerage Clerks	132	122	(10)	(7%)	14
43-4021	Correspondence Clerks	29	29	(1)	(3%)	4
43-4031	Court, Municipal, & License Clerks	495	564	69	14%	56
43-4041	Credit Authorizers, Checkers, & Clerks	69	67	(2)	(3%)	8
43-4051	Customer Service Representatives	7,298	9,139	1,842	25%	1,340



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
43-4061	Eligibility Interviewers, Government Programs	2,528	2,679	151	6%	266
43-4071	File Clerks	682	696	14	2%	95
43-4081	Hotel, Motel, & Resort Desk Clerks	749	810	61	8%	140
43-4111	Interviewers, Except Eligibility & Loan	848	959	112	13%	128
43-4121	Library Assistants, Clerical	310	351	41	13%	55
43-4131	Loan Interviewers & Clerks	348	354	5	2%	38
43-4141	New Accounts Clerks	258	186	(72)	(28%)	25
43-4151	Order Clerks	920	956	36	4%	120
43-4161	Human Resources Assistants, Except Payroll & Timekeeping	488	536	47	10%	67
43-4171	Receptionists & Information Clerks	3,623	4,249	626	17%	627
43-4181	Reservation & Transportation Ticket Agents & Travel Clerks	285	300	15	5%	35
43-4199	Information & Record Clerks, All Other	1,537	1,609	73	5%	201
43-5011	Cargo & Freight Agents	233	251	18	8%	24
43-5021	Couriers & Messengers	480	506	26	5%	52
43-5031	Police, Fire, & Ambulance Dispatchers	339	356	17	5%	36
43-5032	Dispatchers, Except Police, Fire, & Ambulance	969	1,125	155	16%	119
43-5041	Meter Readers, Utilities	375	385	10	3%	33
43-5051	Postal Service Clerks	243	192	(51)	(21%)	18
43-5052	Postal Service Mail Carriers	1,146	891	(256)	(22%)	74
43-5053	Postal Service Mail Sorters, Processors, & Processing Machine Operators	233	167	(66)	(28%)	16
43-5061	Production, Planning, & Expediting Clerks	960	1,088	127	13%	127
43-5071	Shipping, Receiving, & Traffic Clerks	3,811	3,967	156	4%	442
43-5081	Stock Clerks & Order Fillers	9,010	10,276	1,266	14%	1,475
43-5111	Weighers, Measurers, Checkers, & Samplers, Recordkeeping	879	963	84	10%	108
43-6011	Executive Secretaries & Executive Administrative Assistants	1,868	1,954	86	5%	233
43-6012	Legal Secretaries	777	810	33	4%	97
43-6013	Medical Secretaries	2,890	3,545	655	23%	445
43-6014	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	9,044	10,169	1,125	12%	1,244
43-9011	Computer Operators	266	242	(24)	(9%)	28



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
43-9021	Data Entry Keyers	1,301	1,321	20	2%	172
43-9022	Word Processors & Typists	361	345	(16)	(4%)	44
43-9031	Desktop Publishers	38	35	(3)	(7%)	4
43-9041	Insurance Claims & Policy Processing Clerks	1,801	1,912	112	6%	214
43-9051	Mail Clerks & Mail Machine Operators, Except Postal Service	723	592	(131)	(18%)	79
43-9061	Office Clerks, General	13,712	15,258	1,547	11%	2,021
43-9071	Office Machine Operators, Except Computer	101	97	(4)	(4%)	12
43-9081	Proofreaders & Copy Markers	33	35	2	7%	6
43-9111	Statistical Assistants	40	39	(1)	(3%)	5
43-9199	Office & Administrative Support Workers, All Other	1,654	1,825	171	10%	223
45-1011	First-Line Supervisors of Farming, Fishing, & Forestry Workers	2,634	2,555	(79)	(3%)	379
45-2011	Agricultural Inspectors	721	736	15	2%	107
45-2021	Animal Breeders	100	86	(14)	(14%)	15
45-2041	Graders & Sorters, Agricultural Products	3,481	3,634	152	4%	546
45-2091	Agricultural Equipment Operators	3,445	3,873	428	12%	654
45-2092	Farmworkers & Laborers, Crop, Nursery, & Greenhouse	71,530	74,114	2,584	4%	12,519
45-2093	Farmworkers, Farm, Ranch, & Aquacultural Animals	2,462	2,149	(313)	(13%)	381
45-2099	Agricultural Workers, All Other	480	413	(67)	(14%)	74
45-3011	Fishers & Related Fishing Workers	29	27	(2)	(5%)	3
45-3021	Hunters & Trappers	6	6	(0)	(7%)	1
45-4011	Forest & Conservation Workers	249	241	(8)	(3%)	42
45-4021	Fallers	23	22	(1)	(3%)	3
45-4022	Logging Equipment Operators	92	100	8	9%	15
45-4023	Log Graders & Scalers	11	12	1	8%	2
45-4029	Logging Workers, All Other	9	9	(0)	(2%)	1
47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	1,672	1,790	119	7%	203
47-2011	Boilermakers	58	66	8	14%	7
47-2021	Brickmasons & Blockmasons	188	201	14	7%	21
47-2022	Stonemasons	56	59	3	4%	6



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
47-2031	Carpenters	3,276	3,218	(58)	(2%)	329
47-2041	Carpet Installers	172	154	(18)	(10%)	15
47-2042	Floor Layers, Except Carpet, Wood, & Hard Tiles	74	72	(2)	(3%)	7
47-2043	Floor Sanders & Finishers	19	18	(1)	(6%)	2
47-2044	Tile & Marble Setters	475	461	(14)	(3%)	45
47-2051	Cement Masons & Concrete Finishers	1,267	1,307	40	3%	156
47-2053	Terrazzo Workers & Finishers	11	11	(1)	(8%)	1
47-2061	Construction Laborers	4,611	5,127	516	11%	594
47-2071	Paving, Surfacing, & Tamping Equipment Operators	202	199	(3)	(2%)	23
47-2072	Pile-Driver Operators	18	16	(3)	(14%)	2
47-2073	Operating Engineers & Other Construction Equipment Operators	1,049	1,228	179	17%	155
47-2081	Drywall & Ceiling Tile Installers	771	803	32	4%	83
47-2082	Tapers	219	229	10	4%	24
47-2111	Electricians	2,034	2,413	379	19%	307
47-2121	Glaziers	272	271	(1)	(0%)	35
47-2131	Insulation Workers, Floor, Ceiling, & Wall	117	135	18	16%	17
47-2132	Insulation Workers, Mechanical	45	55	10	22%	7
47-2141	Painters, Construction & Maintenance	1,578	1,491	(87)	(6%)	143
47-2142	Paperhangers	11	10	(1)	(10%)	1
47-2151	Pipelayers	345	407	62	18%	49
47-2152	Plumbers, Pipefitters, & Steamfitters	1,354	1,713	360	27%	213
47-2161	Plasterers & Stucco Masons	516	518	2	0%	55
47-2171	Reinforcing Iron & Rebar Workers	124	135	10	8%	16
47-2181	Roofers	630	656	26	4%	77
47-2211	Sheet Metal Workers	529	600	71	13%	72
47-2221	Structural Iron & Steel Workers	235	236	2	1%	28
47-2231	Solar Photovoltaic Installers	137	161	24	18%	20
47-3011	Helpers--Brickmasons, Blockmasons, Stonemasons, & Tile & Marble Setters	151	151	(0)	(0%)	24
47-3012	Helpers--Carpenters	133	133	0	0%	21



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
47-3013	Helpers--Electricians	159	203	44	28%	32
47-3014	Helpers--Painters, Paperhangers, Plasterers, & Stucco Masons	53	52	(1)	(2%)	8
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, & Steamfitters	120	166	46	38%	27
47-3016	Helpers--Roofers	36	39	3	9%	6
47-3019	Helpers, Construction Trades, All Other	97	106	8	9%	16
47-4011	Construction & Building Inspectors	232	269	38	16%	34
47-4021	Elevator Installers & Repairers	32	31	(1)	(2%)	4
47-4031	Fence Erectors	140	154	13	9%	19
47-4041	Hazardous Materials Removal Workers	291	367	76	26%	51
47-4051	Highway Maintenance Workers	193	251	58	30%	30
47-4061	Rail-Track Laying & Maintenance Equipment Operators	22	24	2	8%	3
47-4071	Septic Tank Servicers & Sewer Pipe Cleaners	170	220	50	30%	32
47-4091	Segmental Pavers	18	20	2	12%	2
47-4099	Construction & Related Workers, All Other	128	143	15	12%	17
47-5011	Derrick Operators, Oil & Gas	9	10	1	13%	1
47-5012	Rotary Drill Operators, Oil & Gas	13	16	3	27%	2
47-5013	Service Unit Operators, Oil, Gas, & Mining	49	59	10	20%	8
47-5021	Earth Drillers, Except Oil & Gas	123	151	28	23%	19
47-5031	Explosives Workers, Ordnance Handling Experts, & Blasters	5	7	2	30%	1
47-5041	Continuous Mining Machine Operators	22	28	6	29%	4
47-5042	Mine Cutting & Channeling Machine Operators	5	7	2	52%	1
47-5049	Mining Machine Operators, All Other	1	2	1	48%	0
47-5051	Rock Splitters, Quarry	4	6	2	54%	1
47-5061	Roof Bolters, Mining	2	2	(0)	(18%)	0
47-5071	Roustabouts, Oil & Gas	26	48	22	83%	7
47-5081	Helpers--Extraction Workers	35	42	7	20%	6
47-5099	Extraction Workers, All Other	9	8	(0)	(0%)	1
49-1011	First-Line Supervisors of Mechanics, Installers, & Repairers	1,793	2,063	270	15%	207
49-2011	Computer, Automated Teller, & Office Machine Repairers	319	342	23	7%	40



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
49-2021	Radio, Cellular, & Tower Equipment Installers & Repairs	30	39	9	29%	5
49-2022	Telecommunications Equipment Installers & Repairers, Except Line Installers	1,253	1,440	187	15%	174
49-2091	Avionics Technicians	11	13	2	15%	1
49-2092	Electric Motor, Power Tool, & Related Repairers	71	84	13	18%	9
49-2093	Electrical & Electronics Installers & Repairers, Transportation Equipment	70	77	7	10%	8
49-2094	Electrical & Electronics Repairers, Commercial & Industrial Equipment	231	249	18	8%	25
49-2095	Electrical & Electronics Repairers, Powerhouse, Substation, & Relay	57	60	3	6%	6
49-2096	Electronic Equipment Installers & Repairers, Motor Vehicles	98	70	(28)	(29%)	9
49-2097	Electronic Home Entertainment Equipment Installers & Repairers	81	87	6	7%	11
49-2098	Security & Fire Alarm Systems Installers	179	202	23	13%	25
49-3011	Aircraft Mechanics & Service Technicians	275	285	10	4%	25
49-3021	Automotive Body & Related Repairers	611	668	57	9%	72
49-3022	Automotive Glass Installers & Repairers	57	66	9	16%	7
49-3023	Automotive Service Technicians & Mechanics	3,747	4,208	461	12%	452
49-3031	Bus & Truck Mechanics & Diesel Engine Specialists	910	1,101	191	21%	117
49-3041	Farm Equipment Mechanics & Service Technicians	684	761	77	11%	83
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	770	796	26	3%	84
49-3043	Rail Car Repairers	62	59	(3)	(5%)	6
49-3051	Motorboat Mechanics & Service Technicians	53	61	7	14%	7
49-3052	Motorcycle Mechanics	66	65	(1)	(1%)	8
49-3053	Outdoor Power Equipment & Other Small Engine Mechanics	124	135	11	9%	16
49-3091	Bicycle Repairers	33	29	(4)	(11%)	4
49-3092	Recreational Vehicle Service Technicians	79	75	(4)	(6%)	11
49-3093	Tire Repairers & Changers	560	663	104	19%	94
49-9011	Mechanical Door Repairers	99	99	0	0%	8
49-9012	Control & Valve Installers & Repairers, Except Mechanical Door	236	336	100	43%	34
49-9021	Heating, Air Conditioning, & Refrigeration Mechanics & Installers	1,535	1,875	339	22%	215
49-9031	Home Appliance Repairers	330	402	72	22%	45
49-9041	Industrial Machinery Mechanics	2,186	2,768	582	27%	293



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
49-9043	Maintenance Workers, Machinery	551	644	93	17%	76
49-9044	Millwrights	91	110	18	20%	12
49-9045	Refractory Materials Repairers, Except Brickmasons	3	3	0	6%	0
49-9051	Electrical Power-Line Installers & Repairers	272	357	85	31%	36
49-9052	Telecommunications Line Installers & Repairers	524	610	86	16%	70
49-9061	Camera & Photographic Equipment Repairers	9	10	1	13%	1
49-9062	Medical Equipment Repairers	109	141	32	30%	15
49-9063	Musical Instrument Repairers & Tuners	73	97	25	34%	11
49-9064	Watch Repairers	18	16	(2)	(10%)	2
49-9069	Precision Instrument & Equipment Repairers, All Other	23	26	2	9%	3
49-9071	Maintenance & Repair Workers, General	6,052	6,843	791	13%	766
49-9081	Wind Turbine Service Technicians	59	117	58	97%	15
49-9091	Coin, Vending, & Amusement Machine Servicers & Repairers	194	183	(11)	(6%)	23
49-9092	Commercial Divers	8	12	4	50%	1
49-9093	Fabric Menders, Except Garment	2	2	1	43%	0
49-9094	Locksmiths & Safe Repairers	101	93	(8)	(8%)	10
49-9095	Manufactured Building & Mobile Home Installers	5	5	(0)	(1%)	1
49-9096	Riggers	55	61	5	9%	7
49-9097	Signal & Track Switch Repairers	20	21	0	2%	2
49-9098	Helpers--Installation, Maintenance, & Repair Workers	451	532	82	18%	76
49-9099	Installation, Maintenance, & Repair Workers, All Other	901	969	67	7%	104
51-1011	First-Line Supervisors of Production & Operating Workers	2,422	2,681	259	11%	298
51-2011	Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	26	19	(7)	(25%)	3
51-2021	Coil Winders, Tapers, & Finishers	11	15	3	31%	2
51-2022	Electrical & Electronic Equipment Assemblers	541	591	50	9%	82
51-2023	Electromechanical Equipment Assemblers	119	115	(4)	(4%)	15
51-2031	Engine & Other Machine Assemblers	83	89	6	7%	10
51-2041	Structural Metal Fabricators & Fitters	288	307	19	7%	37
51-2091	Fiberglass Laminators & Fabricators	32	36	3	10%	5



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
51-2092	Team Assemblers	2,695	3,097	402	15%	411
51-2093	Timing Device Assemblers & Adjusters	0	1	0	32%	0
51-2099	Assemblers & Fabricators, All Other	707	849	142	20%	114
51-3011	Bakers	701	818	117	17%	130
51-3021	Butchers & Meat Cutters	686	832	146	21%	117
51-3022	Meat, Poultry, & Fish Cutters & Trimmers	1,369	1,718	350	26%	245
51-3023	Slaughterers & Meat Packers	1,586	1,882	297	19%	264
51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	435	477	42	10%	62
51-3092	Food Batchmakers	1,908	2,056	147	8%	319
51-3093	Food Cooking Machine Operators & Tenders	461	530	69	15%	82
51-3099	Food Processing Workers, All Other	618	726	109	18%	94
51-4011	Computer-Controlled Machine Tool Operators, Metal & Plastic	189	240	51	27%	28
51-4012	Computer Numerically Controlled Machine Tool Programmers, Metal & Plastic	53	65	13	24%	8
51-4021	Extruding & Drawing Machine Setters, Operators, & Tenders, Metal & Plastic	116	107	(8)	(7%)	13
51-4022	Forging Machine Setters, Operators, & Tenders, Metal & Plastic	28	27	(1)	(3%)	3
51-4023	Rolling Machine Setters, Operators, & Tenders, Metal & Plastic	101	92	(9)	(9%)	11
51-4031	Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal & Plastic	355	348	(7)	(2%)	44
51-4032	Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal & Plastic	80	72	(7)	(9%)	9
51-4033	Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal & Plastic	143	139	(5)	(3%)	17
51-4034	Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal & Plastic	136	123	(13)	(9%)	14
51-4035	Milling & Planing Machine Setters, Operators, & Tenders, Metal & Plastic	41	38	(2)	(6%)	5
51-4041	Machinists	943	1,077	134	14%	126
51-4051	Metal-Refining Furnace Operators & Tenders	12	14	2	16%	2
51-4052	Pourers & Casters, Metal	7	4	(3)	(47%)	1
51-4061	Model Makers, Metal & Plastic	8	8	1	11%	1
51-4062	Patternmakers, Metal & Plastic	86	75	(10)	(12%)	9
51-4071	Foundry Mold & Coremakers	9	8	(1)	(15%)	1
51-4072	Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal & Plastic	182	171	(11)	(6%)	22



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
51-4081	Multiple Machine Tool Setters, Operators, & Tenders, Metal & Plastic	114	137	22	20%	17
51-4111	Tool & Die Makers	66	73	7	11%	8
51-4121	Welders, Cutters, Solderers, & Brazers	1,354	1,494	140	10%	180
51-4122	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	82	80	(2)	(2%)	10
51-4191	Heat Treating Equipment Setters, Operators, & Tenders, Metal & Plastic	17	17	1	5%	2
51-4192	Layout Workers, Metal & Plastic	23	21	(2)	(8%)	3
51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	172	146	(26)	(15%)	18
51-4193	Plating & Coating Machine Setters, Operators, & Tenders, Metal & Plastic	64	64	(0)	(1%)	9
51-4194	Tool Grinders, Filers, & Sharpeners	116	114	(2)	(1%)	14
51-4199	Metal Workers & Plastic Workers, All Other	111	87	(24)	(22%)	13
51-5111	Prepress Technicians & Workers	410	388	(22)	(5%)	47
51-5112	Printing Press Operators	72	63	(9)	(13%)	10
51-5113	Print Binding & Finishing Workers	773	862	89	12%	130
51-6011	Laundry & Dry-Cleaning Workers	180	190	10	6%	27
51-6021	Pressers, Textile, Garment, & Related Materials	196	209	13	7%	25
51-6031	Sewing Machine Operators	23	27	4	15%	3
51-6041	Shoe & Leather Workers & Repairers	1	1	0	15%	0
51-6042	Shoe Machine Operators & Tenders	28	29	1	3%	4
51-6051	Sewers, Hand	193	198	5	3%	28
51-6052	Tailors, Dressmakers, & Custom Sewers	2	4	1	56%	1
51-6061	Textile Bleaching & Dyeing Machine Operators & Tenders	11	11	0	1%	2
51-6062	Textile Cutting Machine Setters, Operators, & Tenders	8	15	7	82%	2
51-6063	Textile Knitting & Weaving Machine Setters, Operators, & Tenders	7	16	9	141%	2
51-6064	Textile Winding, Twisting, & Drawing Out Machine Setters, Operators, & Tenders	56	64	7	13%	9
51-6091	Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	3	3	1	22%	0
51-6092	Fabric & Apparel Patternmakers	103	118	15	14%	14
51-6093	Upholsterers	15	19	4	26%	3
51-6099	Textile, Apparel, & Furnishings Workers, All Other	629	607	(22)	(3%)	72
51-7011	Cabinetmakers & Bench Carpenters	38	42	3	8%	5



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
51-7021	Furniture Finishers	3	4	0	12%	0
51-7031	Model Makers, Wood	4	4	0	7%	0
51-7032	Patternmakers, Wood	153	183	31	20%	24
51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	149	185	37	25%	24
51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	50	57	7	13%	7
51-7099	Woodworkers, All Other	2	2	(0)	(4%)	0
51-8011	Nuclear Power Reactor Operators	30	39	9	30%	4
51-8012	Power Distributors & Dispatchers	299	277	(22)	(7%)	29
51-8013	Power Plant Operators	151	168	17	11%	20
51-8021	Stationary Engineers & Boiler Operators	572	615	43	8%	58
51-8031	Water & Wastewater Treatment Plant & System Operators	26	32	6	23%	4
51-8091	Chemical Plant & System Operators	35	88	53	151%	12
51-8092	Gas Plant Operators	47	59	11	24%	7
51-8093	Petroleum Pump System Operators, Refinery Operators, & Gauges	83	84	1	2%	9
51-8099	Plant & System Operators, All Other	70	77	7	11%	10
51-9011	Chemical Equipment Operators & Tenders	867	932	64	7%	112
51-9012	Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	181	195	14	8%	25
51-9021	Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	71	73	2	3%	9
51-9022	Grinding & Polishing Workers, Hand	766	840	74	10%	107
51-9023	Mixing & Blending Machine Setters, Operators, & Tenders	40	41	1	2%	5
51-9031	Cutters & Trimmers, Hand	465	492	28	6%	62
51-9032	Cutting & Slicing Machine Setters, Operators, & Tenders	152	168	16	11%	23
51-9041	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	71	79	8	11%	9
51-9051	Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	2,026	2,292	266	13%	310
51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	97	91	(6)	(6%)	11
51-9071	Jewelers & Precious Stone & Metal Workers	134	126	(8)	(6%)	16
51-9081	Dental Laboratory Technicians	44	49	5	10%	6
51-9082	Medical Appliance Technicians	44	61	17	39%	8
51-9083	Ophthalmic Laboratory Technicians	4,411	5,032	620	14%	662



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
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51-7031	Model Makers, Wood	4	4	0	7%	0
51-7032	Patternmakers, Wood	153	183	31	20%	24
51-7041	Sawing Machine Setters, Operators, & Tenders, Wood	149	185	37	25%	24
51-7042	Woodworking Machine Setters, Operators, & Tenders, Except Sawing	50	57	7	13%	7
51-7099	Woodworkers, All Other	2	2	(0)	(4%)	0
51-8011	Nuclear Power Reactor Operators	30	39	9	30%	4
51-8012	Power Distributors & Dispatchers	299	277	(22)	(7%)	29
51-8013	Power Plant Operators	151	168	17	11%	20
51-8021	Stationary Engineers & Boiler Operators	572	615	43	8%	58
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51-9061	Inspectors, Testers, Sorters, Samplers, & Weighers	97	91	(6)	(6%)	11
51-9071	Jewelers & Precious Stone & Metal Workers	134	126	(8)	(6%)	16
51-9081	Dental Laboratory Technicians	44	49	5	10%	6
51-9082	Medical Appliance Technicians	44	61	17	39%	8
51-9083	Ophthalmic Laboratory Technicians	4,411	5,032	620	14%	662



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	Annual Job Openings
53-3041	Taxi Drivers & Chauffeurs	106	125	20	19%	24
53-3099	Motor Vehicle Operators, All Other	98	96	(2)	(2%)	9
53-4011	Locomotive Engineers	2	1	(1)	(41%)	0
53-4012	Locomotive Firers	9	9	0	3%	1
53-4013	Rail Yard Engineers, Dinkey Operators, & Hostlers	41	40	(0)	(0%)	4
53-4021	Railroad Brake, Signal, & Switch Operators	97	95	(2)	(2%)	10
53-4031	Railroad Conductors & Yardmasters	65	71	6	9%	8
53-4041	Subway & Streetcar Operators	40	43	3	7%	5
53-4099	Rail Transportation Workers, All Other	45	53	8	17%	7
53-5011	Sailors & Marine Oilers	40	45	5	13%	5
53-5021	Captains, Mates, & Pilots of Water Vessels	3	3	0	7%	0
53-5022	Motorboat Operators	15	18	2	14%	2
53-5031	Ship Engineers	9	10	1	14%	1
53-6011	Bridge & Lock Tenders	261	334	73	28%	56
53-6021	Parking Lot Attendants	453	573	120	27%	105
53-6031	Automotive & Watercraft Service Attendants	11	14	3	29%	2
53-6041	Traffic Technicians	122	134	12	10%	15
53-6051	Transportation Inspectors	181	187	6	3%	28
53-6061	Transportation Attendants, Except Flight Attendants	53	60	7	14%	8
53-6099	Transportation Workers, All Other	161	190	30	18%	29
53-7011	Conveyor Operators & Tenders	56	68	11	20%	8
53-7021	Crane & Tower Operators	5	5	(0)	(9%)	1
53-7031	Dredge Operators	150	168	18	12%	21
53-7032	Excavating & Loading Machine & Dragline Operators	1	2	1	49%	0
53-7033	Loading Machine Operators, Underground Mining	5	4	(0)	(7%)	1
53-7041	Hoist & Winch Operators	4,116	4,590	474	12%	580
53-7051	Industrial Truck & Tractor Operators	2,535	2,949	413	16%	462
53-7061	Cleaners of Vehicles & Equipment	11,428	13,097	1,669	15%	2,008
53-7062	Laborers & Freight, Stock, & Material Movers, Hand	394	455	61	15%	69



SOC CODE	SOC TITLE	2017 JOBS	2027 JOBS	CHANGE	% CHANGE	ANNUAL JOB OPENINGS
53-7063	Machine Feeders & Off bearers	5,851	6,771	920	16%	1,139
53-7064	Packers & Packagers, Hand	10	15	5	49%	2
53-7071	Gas Compressor & Gas Pumping Station Operators	39	44	5	12%	6
53-7072	Pump Operators, Except Wellhead Pumpers	2	4	2	150%	1
53-7073	Wellhead Pumpers	599	670	71	12%	90
53-7081	Refuse & Recyclable Material Collectors	0	0	0	inf	0
53-7111	Mine Shuttle Car Operators	19	23	3	18%	3
53-7121	Tank Car, Truck, & Ship Loaders	217	230	13	6%	30
53-7199	Material Moving Workers, All Other	1,080	1,134	54	5%	91

Source: Emsi Employees & Self-Employed 2018.1.



APPENDIX 6: UNEMPLOYMENT

Data on unemployment give researchers an idea of where skills mismatches may exist in the region. Unemployment data can also provide important context when identifying the training programs that are best suited to transitioning unemployed workers into in-demand occupations.

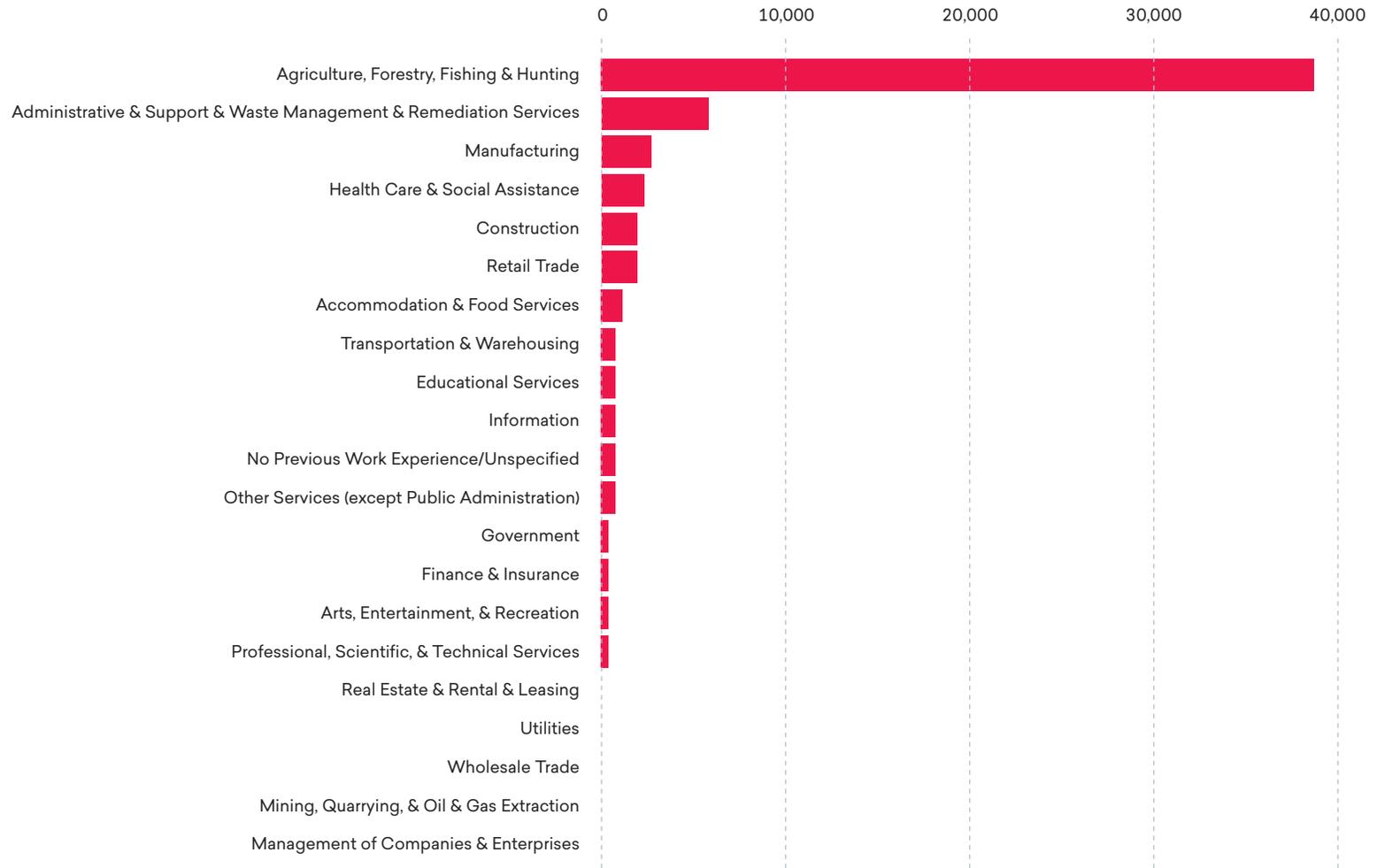
The tables and figures on the following pages present the number of people unemployed by two-digit industry sector¹⁹ in the FCC Service Region. Data reflect January 2018 and follow the same

methodology used by the federal statistical agencies to determine the number of workers in an industry that are not currently employed. The unemployment rate is not provided because it is difficult to accurately determine the size of the labor force in a given industry on a monthly basis. Rather than the unemployment rate, the percent of all unemployed for the region and for the nation are provided to display which industry sectors have the highest concentration of unemployed workers.

¹⁹ Unemployment by industry data is only available at the two-digit level whereas the industry data reported elsewhere in this analysis is at the three-digit level.



FIGURE A6.1: Number of Unemployed Workers by Industry Sector in the FCC Service Region



Source: Emsi Total Unemployment (January 2018).



TABLE A6.1: Number of Unemployed Workers by Industry Sector in the FCC Service Region with National Comparison

NAICS CODE	NAICS TITLE	Number of unemployed	Regional % of unemployed	National % of unemployed
11	Agriculture, Forestry, Fishing & Hunting	38,445	64%	4%
56	Administrative & Support & Waste Management & Remediation Services	5,965	10%	13%
31	Manufacturing	2,564	4%	10%
62	Health Care & Social Assistance	2,369	4%	9%
23	Construction	2,054	3%	11%
44	Retail Trade	1,931	3%	8%
72	Accommodation & Food Services	1,212	2%	6%
48	Transportation & Warehousing	809	1%	3%
61	Educational Services	741	1%	3%
51	Information	726	1%	2%
99	No Previous Work Experience/Unspecified	701	1%	8%
81	Other Services (except Public Administration)	664	1%	3%
90	Government	449	1%	2%
52	Finance & Insurance	408	1%	3%
71	Arts, Entertainment, & Recreation	258	0%	2%
54	Professional, Scientific, & Technical Services	237	0%	6%
53	Real Estate & Rental & Leasing	191	0%	2%
22	Utilities	116	0%	0%
42	Wholesale Trade	93	0%	4%
21	Mining, Quarrying, & Oil & Gas Extraction	22	0%	1%
55	Management of Companies & Enterprises	0	0%	1%

* NAICS refers to the North American Industry Classification System.

Source: Emsi Total Unemployment (January 2018).



FIGURE A6.2: Number of Unemployed Workers by Occupational Group in the FCC Service Region



TABLE A6.2: Number of Unemployed Workers by Occupational Group in the FCC Service Region with National Comparison

SOC CODE	SOC TITLE	NUMBER OF UNEMPLOYED	REGIONAL % OF UNEMPLOYED	NATIONAL % OF UNEMPLOYED
45-0000	Farming, Fishing, & Forestry	6,828	11%	2%
43-0000	Office & Administrative Support	5,969	10%	12%
53-0000	Transportation & Material Moving	5,814	10%	6%
41-0000	Sales & Related	5,597	9%	7%
51-0000	Production	4,671	8%	8%
35-0000	Food Preparation & Serving Related	4,115	7%	5%
47-0000	Construction & Extraction	4,092	7%	10%
99-0000	No Previous Work Experience/Unspecified	3,744	6%	12%
37-0000	Building & Grounds Cleaning & Maintenance	3,058	5%	4%
25-0000	Education, Training, & Library	2,734	5%	2%
11-0000	Management	2,471	4%	9%
39-0000	Personal Care & Service	1,977	3%	2%
49-0000	Installation, Maintenance, & Repair	1,965	3%	4%
31-0000	Healthcare Support	1,465	2%	3%
29-0000	Healthcare Practitioners & Technical	1,179	2%	2%
33-0000	Protective Service	1,028	2%	1%
13-0000	Business & Financial Operations	1,005	2%	4%
21-0000	Community & Social Service	746	1%	1%
27-0000	Arts, Design, Entertainment, Sports, & Media	508	1%	2%
15-0000	Computer & Mathematical	257	0%	2%
19-0000	Life, Physical, & Social Science	215	0%	1%
17-0000	Architecture & Engineering	214	0%	1%
55-0000	Military	182	0%	0%

* SOC refers to Standard Occupational Classification.

Source: Emsi Total Unemployment (January 2018).

