



# Hawaii's Technology Workforce Occupations and Projections



**Department of Business, Economic Development and  
Tourism**

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## Introduction

This report looks at the current and projected occupational demands of Hawaii's technology sector. It builds upon an earlier study in 2008 prepared collaboratively by the Hawaii Science and Technology Institute (HiSciTech), the Department of Business, Economic Development and Tourism (DBEDT) and a number of other stakeholders. That study redefined the technology sector for Hawaii, identified key occupations, and discussed related educational resources.

In late 2009, DBEDT updated the data for the redefined technology sector and a number of other emerging growth sectors of the economy in the report, *Benchmarking Hawaii's Emerging Industries*, which is available on the DBEDT website.<sup>1</sup> However, that report did not address the technology sector's occupational characteristics. In December 2010, DBEDT filled that gap by updating the earlier HiSciTech/DBEDT analysis of technology occupations in the report, *Hawaii's Technology Workforce – Occupations and Projections*. This report updates the DBEDT 2010 report based on more recent data and slightly changed definition of the technology sector due to changes in the North American Industry Classification System (NAICS). The industries included in the technology sector by NAICS code are provided in Appendix A of this report.

Data for this report were from Economic Modeling Services, Inc. (EMSI), which was the primary source of data in the HiSciTech/DBEDT report in 2008, the Emerging Industry Benchmark report by DBEDT in 2009, and the Hawaii's Technology workforce report by DBEDT in 2010. EMSI's data subscription service combines publicly available labor and economic data from the U.S. Bureau of Labor Statistics and the Bureau of Economic Analysis into data sets covering very detailed industry and occupational areas for the state, counties and nation. The EMSI system allows very large amounts of data to be filtered and extracted in a form that saves hundreds of staff hours over alternative methods for data collection.

## Industry Groups of the Technology Sector

Before looking at occupations in the technology sector, it is helpful to look briefly at the industries in this sector. Most people have heard of the high-profile technology activities of astronomy, digital media, ocean science and maybe even dual use technology. These activities are actually the products of a number of producing industries, each of which contributes to a portion of those activities. For instance, the research and development industry contributes products and services to all of the high-profile activities. The computer services industry also contributes services to these activities, particularly digital media. However, it becomes very difficult to account for the jobs in the high-profile technology activities, but easy to account for jobs in the industries that contribute to the activities. Therefore, most measures of technology by

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<sup>1</sup> [http://hawaii.gov/dbedt/info/economic/data\\_reports/emerging-industries](http://hawaii.gov/dbedt/info/economic/data_reports/emerging-industries).

states, the federal government, and research organizations are based on job counts and incomes for the producing industries in technology.

Table 1 shows the most recent accounting for jobs in Hawaii's technology sector by industry groups.<sup>2</sup> Hawaii's technology sector includes eight major industry groups. The eight groups had 24,044 jobs in 2011, accounted for about 3.0% of all civilian jobs in Hawaii. Between 2002 and 2011, the technology sector in Hawaii posted an average of 2.0% gain in jobs per year compared with an average annual growth of 1.3% for total civilian jobs.

**Table 1. Industry Groups and Jobs in Hawaii's Technology Sector**

Industry Groups	Jobs 1/		Percent of Total Sector 2011	Average Annual % Change 2002-2011
	2002	2011		
<b>State Total Civilian Jobs</b>	710,548	794,998	NA	1.3%
<b>Technology Sector</b>	20,064	24,044	100.0%	2.0%
Computer Services	5,396	6,288	26.2%	1.7%
Engineering and Related Services	5,379	5,786	24.1%	0.8%
Technical Consulting Services	2,695	4,431	18.4%	5.7%
Research & Development Services	1,988	2,519	10.5%	2.7%
Research and Development in Biotechnology	493	614	2.6%	2.5%
Information and Telecommunications Technology	1,635	1,321	5.5%	-2.3%
Medical Labs and Imaging Centers	1,334	1,712	7.1%	2.8%
Technology Equipment Distribution	847	721	3.0%	-1.8%
Technology Manufacturing	790	1,266	5.3%	5.4%
Alternate Power Generation	160	551	2.3%	14.7%
Chemical & Pharmaceutical Mfg	172	118	0.5%	-4.1%
Other Technology Manufacturing	145	109	0.5%	-3.1%
Medical Device Manufacturing	313	488	2.0%	5.1%

1/ Includes wage & salary, sole proprietors & self employed.

Source: DBEDT based on data from Economic Modeling Specialists, Inc. (EMSI).

The Computer Services group accounted for the largest share of technology jobs in Hawaii with about 26.2% of the total technology jobs in 2011; followed by the Engineering and Related Services group, the Technical Consulting Services group, and the Research & Development Services group. Together, these four industry groups accounted for almost 80% of the technology jobs in Hawaii. The smallest industry group in technology is the Technology Equipment Distribution group, followed by the Technology Manufacturing group.

From 2002 to 2011, the Technical Consulting Services group experienced the fastest growth among the eight technology groups, increased 5.7% per year on average. The Technology Manufacturing group increased 5.4% per year, mainly due to rapid growth in the sub-groups of Alternative Power Generation and Medical Device Manufacturing, which increased 14.7% and 5.1% per year, respectively. The Information and Telecommunications Technology group experienced the largest negative growth,

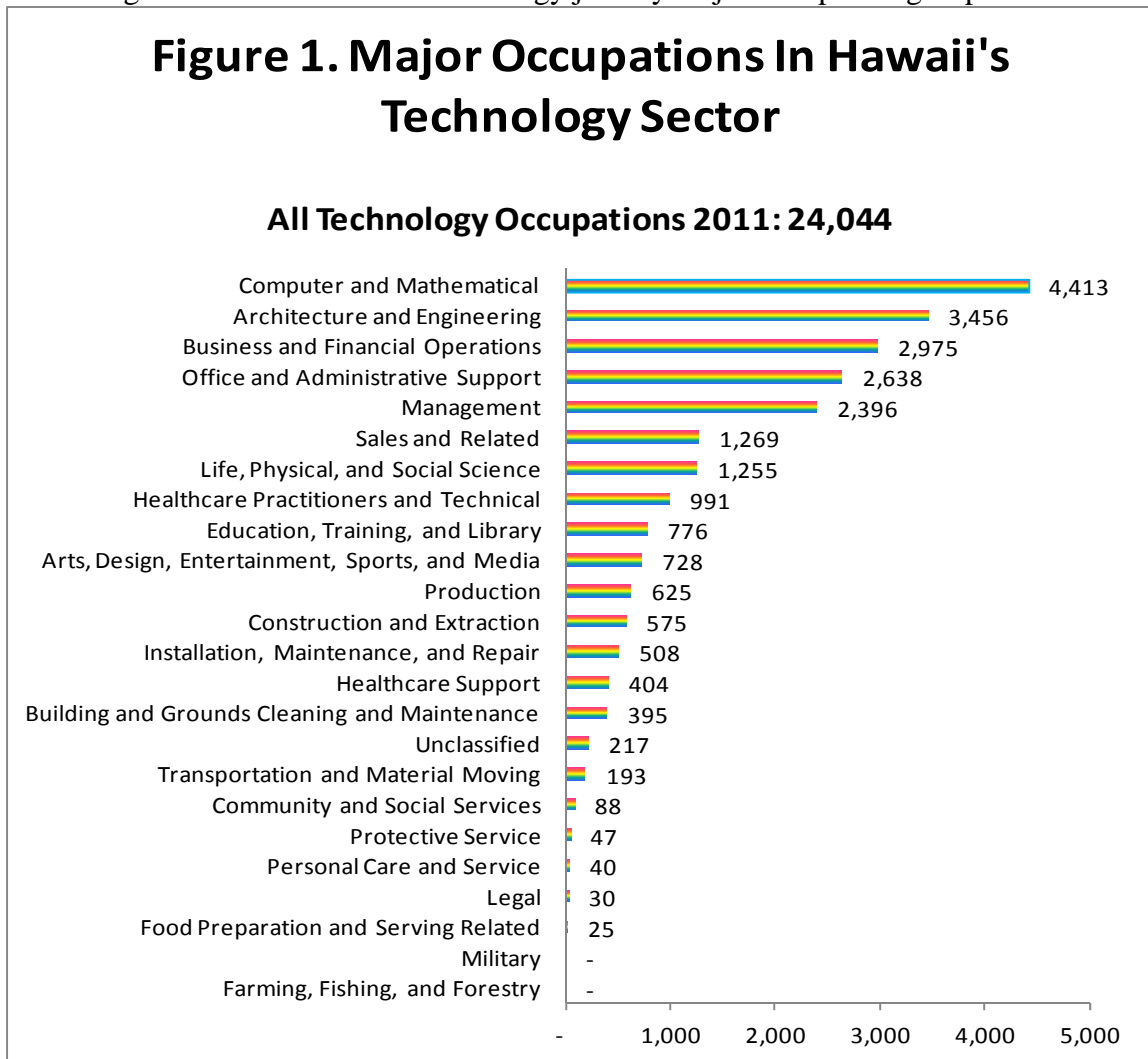
<sup>2</sup> Include proprietor and self-employed.

decreased 2.3% per year; followed by the Technology Equipment Distribution group, decreased 1.8% per year.

## Occupational Profile of the Technology Sector

EMSI's on line database provides detailed job data by NAICS code and by Standard Occupational Classification (SOC) code. For all of the industries by NAICS, jobs by detailed SOC code (about 766 detailed occupations) are provided.<sup>3</sup> The jobs of all the technology industries by SOC code can be calculated using the EMSI on-line database. The 766 detailed occupations are grouped into 24 condensed occupations, including 23 civilian occupations and a military occupation, to better identify major characteristics of the technology labor force. Data for the detailed occupations (by SOC code) are provided in Appendix B of this report.

Figure 1 shows Hawaii's technology jobs by major occupation groups in 2011.

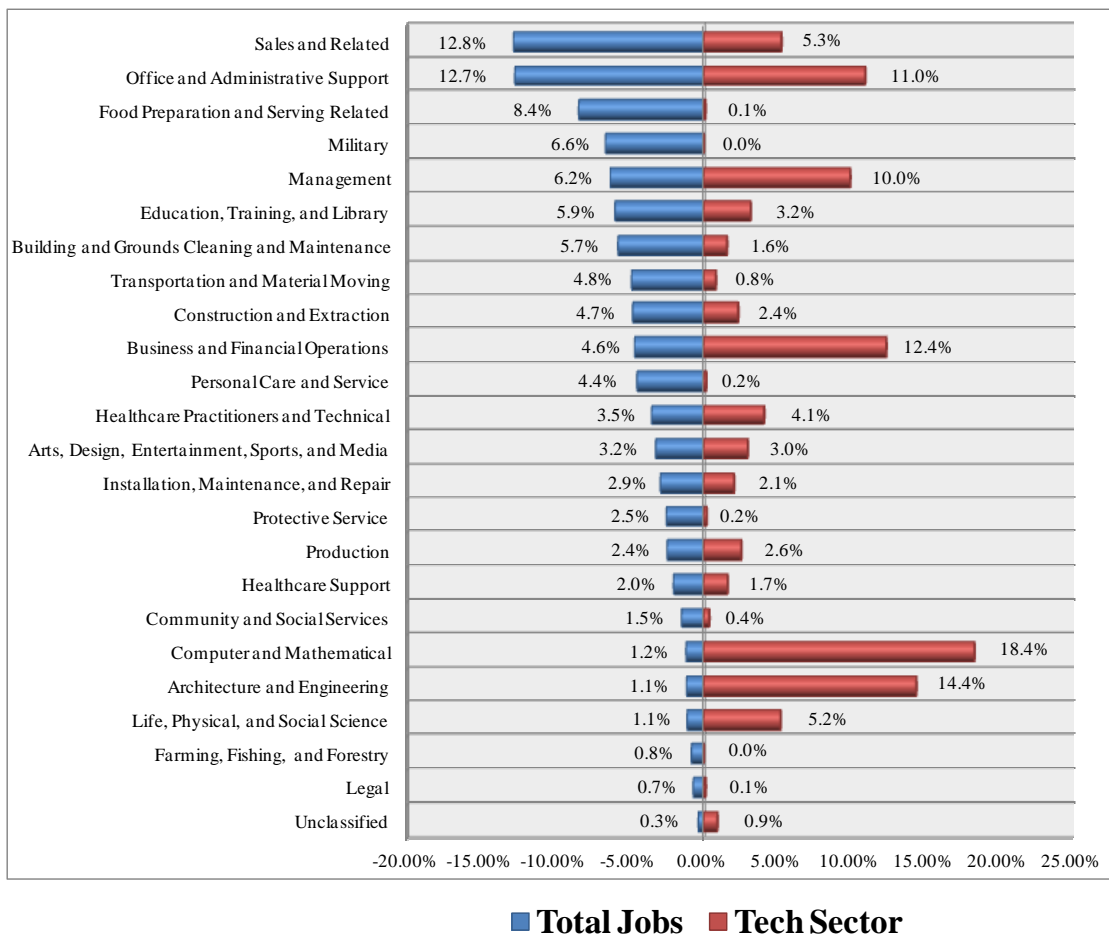


<sup>3</sup> Jobs in some small occupations are not available in EMSI's on-line database. For these occupations, the job data are estimated by DBEDT.

Not surprisingly, the Computer and Mathematical Occupation group is the single largest group, accounted for 18.4% of all technology jobs in 2011. The technology sector also employed a larger proportion of Architecture and Engineering occupations (14.4%), Business and Financial Operations occupations (12.4%), Office and Administrative Support occupations (11.0%), and Management occupations (10.0%). The occupation groups that employed very limited technology jobs include the Farming, Fishing, and Forestry group, the Food Preparation and Serving Related group, the Legal group, the Personal Care and Service group, and the Protective Service group.

To better appreciate the uniqueness of the occupational mix in technology, the jobs in technology were compared to the civilian economy as a whole. Figure 2 shows that comparison.

**Figure 2. Percent of State and Tech Sector Jobs by Occupation in 2011**



Occupationally, the technology sector is quite different from Hawaii's economy as a whole. About 45.1% of the technology jobs are in the three major occupational areas -- Computer & Mathematical, Architecture & Engineering, and Business and Financial Operations. By comparison, these occupations make up only about 6.9 of the total workforce statewide.

In addition to the top three technology occupation groups, the technology sector has a notably higher proportion of Office and Administrative Support occupations and Managers.

The high proportion of technology jobs in the Computer & Mathematical group and the Architecture & Engineering group is not a surprise given the nature of these groups, which are focused on providing commercial products based on the results of cutting-edge technologies. What may be surprising is the higher-than-average proportion of the Business & Financial Operations occupations, the Office and Administrative Support occupations, and the Management occupations in technology. This suggests that while the core of the technology sector may be technical occupations, the technology sector is also highly dependent on administrative and managerial support occupations.

## **Occupations that Depend on Technology**

Figure 2 shows how much or little technology depends on certain occupations like computer services, architecture & engineering, and business administration. What about the opposite relationship? That is, how important is the technology sector as a source of employment for the major occupations in the broader economy?

Figure 3 shows the percentages of the technology jobs in the state total jobs by major occupation groups. In 2011, Hawaii's total technology jobs accounted for only about 2.8% of state total jobs. Given its small relative size, it is not surprising that the technology sector accounted for only a small proportion of most of Hawaii's occupations. Even for some occupations upon which technology is highly dependent, such as office and administrative support and management jobs, the technology sector accounted for only a modest proportion of the total state jobs of those occupations.

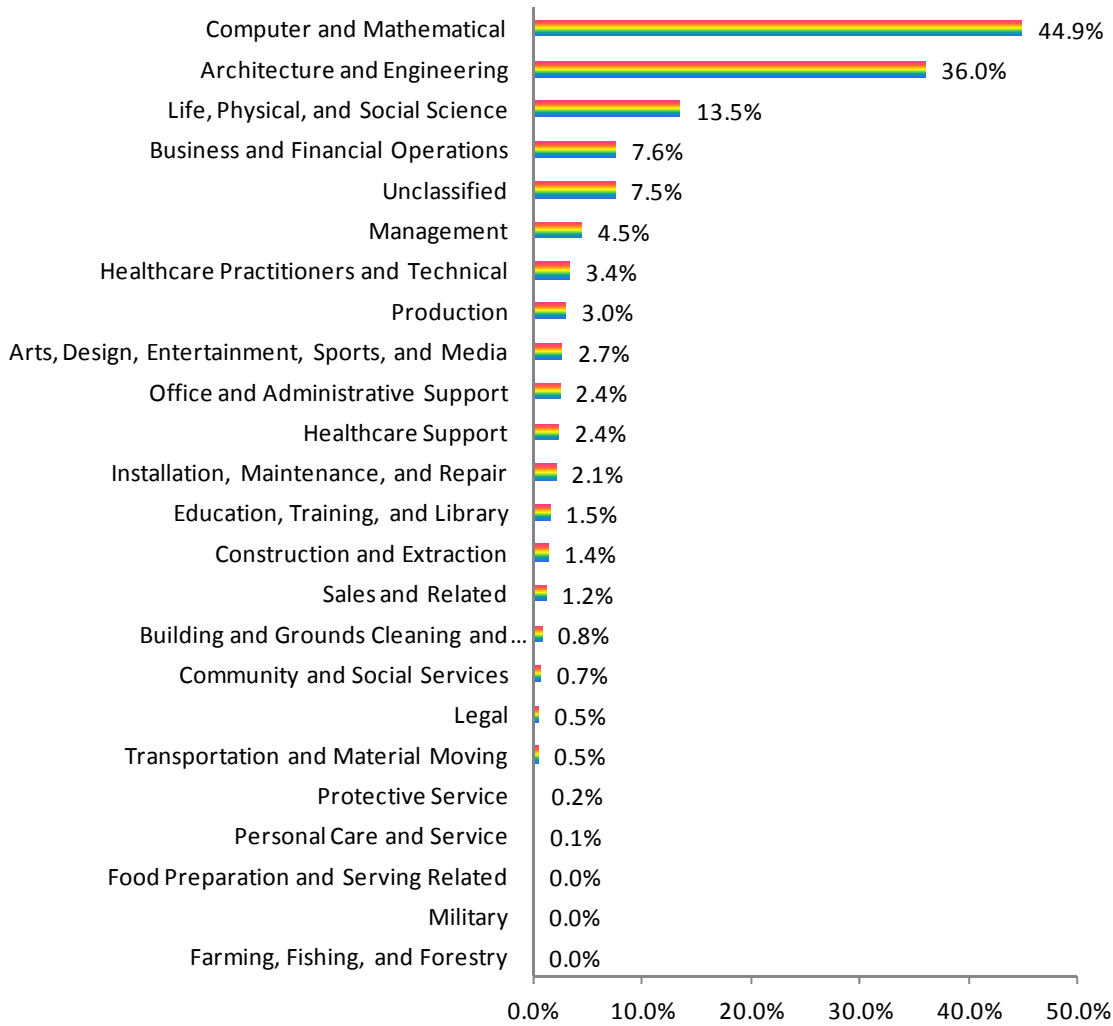
However, for some key occupational groups, the technology sector is a major source of employment. For instance, the technology sector accounted for 44.9% of state total jobs in the Computer and Mathematical occupations, 36.0% total jobs in the Architecture & Engineering occupations, and 13.5% total jobs in the Life, Physical and Social Science occupations.

This is important information for planning how the future occupational needs of technology can be met without unduly competing with other industries for key occupations. If growth in the technology sector accelerates in the future, Figure 3 suggests that filling most occupational positions should not be difficult. For most occupations, technology could attract workers from other industries without the overall supply of those occupations being affected much. However, in the highly skilled areas of

Computer & Mathematical, Architecture & Engineering, and Life & Physical & Social Sciences, the technology sector's labor demands could come into sharp competition with other industries if the supply of new workers in these professions cannot keep up with higher demand.

### Figure 3. Percent of Hawaii's Technology Jobs in Total State Jobs by Occupation

Percent of Technology Jobs in All State Jobs 2011: 2.8%





## Occupational Projections and Wages for Technology

In order to better understand the potential demand for occupations in the technology sector, we need to start with the projected growth for technology in the coming years. The EMSI database provides these occupations based on underlying projections by the U.S. Bureau of Labor Statistics (BLS).

As Table 2 shows, the BLS based projections expect a very modest 1.0% average annual growth in Hawaii's civilian jobs count, including self-employed and proprietors, over the 2011 to 2021 period. Because the projections are very modest they can be seen as a minimum baseline projection for purposes of this illustration.

**Table 2. Projected Growth in Technology Occupation, 2011 to 2021**

Occupation	2011 Jobs	2021 Projected	Change in Jobs	Ave. Ann. % Growth	Ave. Hourly Wages 2011
<b>Total Civilian Jobs</b>	794,997	874,588	79,591	1.0%	\$19.25
<b>Total Technology Jobs</b>	24,044	27,411	3,367	1.3%	\$26.16
Business and Financial Operations	2,975	3,776	801	2.4%	\$26.82
Computer and Mathematical	4,413	4,992	579	1.2%	\$30.43
Management	2,396	2,786	390	1.5%	\$30.27
Office and Administrative Support	2,638	2,994	356	1.3%	\$16.42
Healthcare Practitioners and Technical	991	1,248	257	2.3%	\$41.03
Life, Physical, and Social Science	1,255	1,473	218	1.6%	\$29.38
Production	625	827	202	2.8%	\$15.95
Sales and Related	1,269	1,468	199	1.5%	\$15.29
Unclassified	217	352	135	5.0%	\$13.59
Arts, Design, Entertainment, Sports, and Media	728	814	86	1.1%	\$18.37
Architecture and Engineering	3,456	3,533	77	0.2%	\$33.23
Healthcare Support	404	474	70	1.6%	\$14.56
Protective Service	47	64	17	3.1%	\$18.90
Construction and Extraction	575	589	14	0.2%	\$24.61
Community and Social Services	88	99	11	1.2%	\$21.73
Food Preparation and Serving Related	25	33	8	2.8%	\$11.96
Transportation and Material Moving	193	198	5	0.3%	\$16.13
Installation, Maintenance, and Repair	508	512	4	0.1%	\$21.15
Legal	30	33	3	1.0%	\$35.32
Farming, Fishing, and Forestry	0	0	0	NA	\$13.74
Building and Grounds Cleaning and Maintenance	395	393	-2	-0.1%	\$13.13
Personal Care and Service	40	37	-3	-0.8%	\$11.50
Education, Training, and Library	776	716	-60	-0.8%	\$22.39

Source: DBEDT; Data from EMSI.

The projections indicate that the technology sector will likely out-perform overall jobs growth in the economy, with an average 1.3% increase per year. From 2011 to 2021, the technology sector is projected to add 3,367 new jobs. The Business and Financial Operations group is expected to add the most jobs (801 jobs), followed by the Computer and Mathematical group (579 jobs), the Management group (390 jobs), the Office and Administrative Support group (356 jobs), and the Healthcare Practitioners and

Technical group. The Education, Training and Library group is expected to lose technology jobs.

Average hourly wages in the technology sector were significantly higher on average than for the economy as a whole by about 35.9%. The technology occupations such as Healthcare Practitioners & Technical, Legal, Architecture & Engineering, Computer & Mathematical, Management, and Life & Physical & Social Sciences were above average for the technology sector as a whole.

As indicated, the projections for the technology sector occupational demand in Table 2 due to growth in the sector appear very modest. However, these job gains represent less than half of the total demand for workers that technology will actually place on the occupations market. What is missing in Table 2 is the demand for workers needed to replace those leaving these occupations due to retirement and other factors. The combination of workforce demand from growth shown in Table 2 and the replacement needs sum up to the total job openings in the economy over the 2011 to 2021 period. Total openings are a better way to measure how many additional workers Hawaii's industries will need to remain healthy - and what educational and workforce efforts must address.

**Table 3. Effect of Replacement Needs on Occupational Demand in Technology, 2011 to 2021**

Occupation	Growth Needs	Replacement Needs	Total Openings	Replacement as % of Openings	% Change Due to Total Openings
<b>Total Civilian Jobs</b>	79,591	189,636	269,227	70.4%	3.0%
<b>Total Technology Jobs</b>	3,367	5,196	8,563	60.7%	3.1%
Computer and Mathematical	579	901	1,480	60.9%	2.9%
Business and Financial Operations	801	551	1,352	40.7%	3.8%
Office and Administrative Support	356	601	957	62.8%	3.1%
Management	390	520	910	57.2%	3.3%
Architecture and Engineering	77	757	834	90.8%	2.2%
Life, Physical, and Social Science	218	399	617	64.6%	4.1%
Sales and Related	199	342	541	63.2%	3.6%
Healthcare Practitioners and Technical	257	202	459	44.0%	3.9%
Production	202	142	344	41.2%	4.5%
Arts, Design, Entertainment, Sports, and Media	86	184	270	68.2%	3.2%
Unclassified	135	0	135	0.0%	5.0%
Healthcare Support	70	48	118	40.5%	2.6%
Construction and Extraction	14	100	114	87.7%	1.8%
Installation, Maintenance, and Repair	4	106	110	96.4%	2.0%
Education, Training, and Library	-60	170	110	154.8%	1.3%
Building and Grounds Cleaning and Maintenance	-2	66	64	103.1%	1.5%
Transportation and Material Moving	5	52	57	91.2%	2.6%
Community and Social Services	11	19	30	63.5%	3.0%
Protective Service	17	13	30	43.0%	5.0%
Food Preparation and Serving Related	8	9	17	54.0%	5.4%
Legal	3	5	8	64.2%	2.5%
Personal Care and Service	-3	10	7	144.3%	1.6%
Farming, Fishing, and Forestry	0	0	0	NA	NA

Source: DBEDT; Data from EMSI.

BLS and EMSI also project these replacement needs and total openings. Those are shown in Table 3 for the technology sector and Hawaii’s overall civilian economy.

The magnitude of the total workforce demand over the next decade when replacement needs are included is startling. The number of new workers in the economy needed just to replace those leaving the labor force is more than two times the number needed for expected growth. That is: about two-thirds of the openings over the next decade will likely be for replacement workers.<sup>4</sup>

The driving force behind the high replacement rate in the coming years is the expected retirement of the huge, baby boom generation (born between 1946 and 1964). The leading edge of this group became eligible for early retirement under social security in 2008 and the trailing edge of the generation will not reach full retirement age until

<sup>4</sup> Of course, the extent to which workers choose or are encouraged to delay retirement or reenter the workforce after retirement could reduce the demand for new workforce entrants. In fact, this may be a key policy approach in dealing with potential labor shortages.

about 2030 under current rules. Over this period, a disproportionate share of the workforce could need replacing.

For the technology sector the replacement needs will be less severe than for the economy as a whole, but still significant. About 60% of the openings in the technology sector will be for replacements. This still means that in addition to the 3,367 new workers needed for growth in technology, another 5,196 workers will be needed to replace those leaving the occupation.

The balance between new and replacement needs is better for some occupations such as Business & Financial Operations, Healthcare, Practitioners and Technical, Healthcare Support, Production, and Protective Service occupations where less than half of the openings will be due to replacement needs. However, some key occupations such as Computer and Mathematical, Office and Administrative Support, Architecture and Engineering, and Life, Physical and Social Science occupations have a higher (more than 60%) replacement rate.

Adding replacement workers into the equation also means that the workforce as a whole must grow fast enough to ensure that the demand for both growth and replacement workers is met. For instance, while the total civilian workforce needed to meet growth requirements under the EMSI projections need only grow 1.0% per year, to fill all openings, the number of new workforce entrants will need to expand by around 3.0% per year. This is potentially around 27,000 positions that will need to be filled each year over the next decade.

For the technology sector as a whole, the annual average growth rate of total openings increased to 3.1%. Some key occupations such as Business & Financial Operations, Life, Physical and Social Science, Healthcare, Practitioners and Technical, Production, and Sales Related occupations may need to grow even faster to fill replacements.

Table 4 intends to identify potential bottlenecks in the supply of occupations by comparing the openings expected in technology with the demand for those same occupations in the civilian economy as a whole between 2011 and 2021.

The table shows that the technology sector will likely be a major source of employment in the economy for certain, core technical occupations. In particular, the technology sector may absorb 48.3% of the openings for Computer and Mathematical, 36.6% for Architecture & Engineering, and 15.7% for Life, Physical and Social Science occupations.

Table 4. Technology Share of Occupational Demand, 2011 to 2021

Occupation	Total Openings 2011 to 2021		
	Technology Sector	Civilian Economy 1/	% of Total Demand from Tech. Sector
<b>Total</b>	8,563	267,074	3.2%
Computer and Mathematical	1,480	3,067	48.3%
Architecture and Engineering	834	2,277	36.6%
Unclassified	135	623	21.7%
Life, Physical, and Social Science	617	3,922	15.7%
Business and Financial Operations	1,352	14,462	9.3%
Production	344	5,473	6.3%
Management	910	17,809	5.1%
Healthcare Practitioners and Technical	459	9,796	4.7%
Office and Administrative Support	957	27,403	3.5%
Arts, Design, Entertainment, Sports, and Media	270	8,812	3.1%
Healthcare Support	118	5,702	2.1%
Installation, Maintenance, and Repair	110	6,681	1.6%
Sales and Related	541	38,406	1.4%
Construction and Extraction	114	12,018	0.9%
Legal	8	1,223	0.7%
Community and Social Services	30	4,688	0.6%
Education, Training, and Library	110	18,111	0.6%
Transportation and Material Moving	57	13,385	0.4%
Building and Grounds Cleaning and Maintenance	64	15,765	0.4%
Protective Service	30	10,274	0.3%
Food Preparation and Serving Related	17	30,008	0.1%
Personal Care and Service	7	17,169	0.0%

1/ Includes only the occupations for each openings are also found in the technology sector.

Source: DBEDT; Data from EMSI.

For other occupations upon which technology relies, like Business and Financial Operations, Production, and Management occupations, the technology sector will account for only about 5-10% of the total openings. These occupations are important to a wide range of industries in the economy, so the demand by technology will be proportionately smaller than for the more specialized technical and scientific occupations.

## Stem Occupations in the Technology Sector

This overview report of occupations in the technology sector is concluded with a discussion of occupations in STEM, which stands for Science, Technology, Engineering and Math. STEM occupations are those that heavily utilize workers with education and skills in science, technology, engineering, and/or mathematics. These occupations require specialized post-secondary education and often bachelors and advanced degrees.

The occupations requiring programs in STEM education have been identified in detail by the Occupational Information Network (O\*NET). The program is sponsored by the U.S. Department of Labor, Employment and Training Administration. The O\*NET STEM occupations list is extensive and detailed, and includes not only areas of science and technology, but also key jobs in health care, business and even construction and agriculture. The list is an evolving work in progress, with additional occupations added over time.<sup>5</sup>

Table 5 shows the STEM occupations in the technology sector and compares them with STEM occupations in the economy as a whole as well as with all other technology occupations.

About 40.5% of the jobs in the technology sector fall into the O\*NET, STEM classification. All Computer and Mathematical jobs are considered STEM occupations. However, even in very technical areas like Architecture & Engineering, and Life, Physical and Social Sciences, a proportion of the jobs are not in STEM categories.

The technology sector accounted for about 15.8% of all STEM jobs in Hawaii's civilian economy in 2011, even though it only accounted for 2.8% of all civilian jobs. The technology sector accounted for 45.0% of STEM jobs in Computer and Mathematical, and 35.0% of STEM jobs in Architecture and Engineering. The technology sector accounted for just 12.0% of statewide STEM jobs in Life, Physical and Social Science. Most STEM jobs in this last occupational area are probably located in State and Federal governments, and in post-secondary education institutions, for which separate data are not available.

At \$31.65, the average hourly wage for STEM occupations in the technology sector was well above the average of \$26.16 for technology occupations as a whole, shown in Table 2. STEM occupations in most of the major occupational areas also exceeded the corresponding non-STEM average with the exception of Healthcare, Practitioners and Technical, Architecture & Engineering, Arts & Design & Entertainment & Sports & Media, and Installation & Maintenance & Repair.

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<sup>5</sup> The list may be found at: <http://online.onetcenter.org/>.

**Table 5. Hawaii STEM Occupations, 2011**

Description	Technology Sector				All Civilian Occupation	
	All Tech Jobs	STEM Tech Jobs	% of STEM in Tech	Ave. STEM Hourly Wage	STEM Jobs	Tech as % of all STEM Jobs
<b>Total</b>	24,044	9,727	40.5%	\$31.65	61,482	15.8%
Computer and Mathematical	4,413	4,413	100.0%	\$30.46	9,817	45.0%
Architecture and Engineering	3,456	3,030	87.7%	\$32.95	8,650	35.0%
Life, Physical, and Social Science	1,255	881	70.2%	\$30.49	7,353	12.0%
Business and Financial Operations Management	2,975	656	22.1%	\$27.83	17,083	3.8%
Arts, Design, Entertainment, Sports, and Media Production	2,396	512	21.4%	\$46.56	3,639	14.1%
Healthcare Practitioners and Technical	728	115	15.8%	\$18.07	1,459	7.9%
Food Preparation and Serving Related	625	51	8.2%	\$19.04	1,013	5.0%
Installation, Maintenance, and Repair	991	27	2.7%	\$32.55	413	6.5%
Food Preparation and Serving Related	25	18	72.0%	\$16.66	6,352	0.3%
Installation, Maintenance, and Repair	508	15	3.0%	\$18.30	3,629	0.4%
Office and Administrative Support	2,638	7	0.3%	\$18.23	73	9.6%
Transportation and Material Moving	193	2	1.0%	\$28.92	159	1.3%
Community and Social Services	88	0	0.0%	\$0.00	0	NA
Legal	30	0	0.0%	\$0.00	0	NA
Education, Training, and Library	776	0	0.0%	\$0.00	0	NA
Healthcare Support	404	0	0.0%	\$0.00	0	NA
Protective Service	47	0	0.0%	\$0.00	0	NA
Building and Grounds Cleaning and Maintenance	395	0	0.0%	\$0.00	0	NA
Personal Care and Service	40	0	0.0%	\$0.00	0	NA
Sales and Related	1,269	0	0.0%	\$0.00	0	NA
Farming, Fishing, and Forestry	0	0	NA	\$0.00	1,842	0.0%
Construction and Extraction	575	0	0.0%	\$0.00	0	NA
Unclassified	217	0	0.0%	\$0.00	0	NA

Source: DBEDT; Data from EMSI.

The relatively moderate proportion of STEM occupations in the technology sector (40.5%) does not mean that the remaining jobs in the sector are of less skill level. Many jobs in administration, management, financial, legal and other areas require as much or perhaps more training than the STEM jobs. STEM occupations are more focused on the scientific and engineering aspects of technology and this is an area in which the U.S. has been gradually lagging behind. It is therefore a priority for the education and workforce community.

## Conclusion

With the development of better data for the industry side of the technology sector, this report has sought to extend research on this sector to the occupational side. The purpose of this study was to identify the technology sector's occupational profile and see how that profile compares to the larger civilian workforce in Hawaii. Another purpose was to look at the expected demand for occupations by the technology sector over the next decade and how that also compares with demand in the larger economy for the same occupations. In particular, the occupational demand analysis went beyond the aspect of net growth in the sector to look also at the demand for replacement workers as retirements from the labor force accelerates in the years to come.

This study did not address the supply side of the occupational equation – that is, the output of trained workers from the educational system that would fill these jobs.

With reliable data on educational and workforce completions, it would be possible to help shed light on the capacity of the education and training community to meet the expected occupational demands.

Sources of data do exist that may permit such an analysis in the future. However, more work must be done to validate those data and ensure that reliable supply and demand comparisons are being made. In the meantime, it is hoped that this occupational data will help the industry and development organizations better plan for future occupational needs.



## Appendix A: Technology Sector by NAICS Industry

NAICS	Description	2011 Jobs
	Total Jobs	851,506
	Technology Sector Jobs	24,044
	<b>Computer Services</b>	<b>6,288</b>
541511	Custom Computer Programming Services	1,668
541512	Computer Systems Design Services	2,751
541513	Computer Facilities Management Services	1,486
541519	Other Computer Related Services	383
	<b>Engineering and Related Services</b>	<b>5,786</b>
541310	Architectural Services	1,536
541320	Landscape Architectural Services	357
541330	Engineering Services	3,680
541360	Geophysical Surveying and Mapping Services	37
541380	Testing Laboratories	176
	<b>Technical Consulting Services</b>	<b>4,431</b>
541611	Administrative Management and General Management Consulting Services	2,484
541614	Process, Physical Distribution, and Logistics Consulting Services	251
541620	Environmental Consulting Services	760
541690	Other Scientific and Technical Consulting Services	879
611420	Computer Training (Private)	57
	<b>Research &amp; Development Services</b>	<b>2,519</b>
541711	Research and Development in Biotechnology	614
541712	Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology)	1,626
541720	Research and Development in the Social Sciences and Humanities	279
	<b>Information and Telecommunications Technology</b>	<b>1,321</b>
511210	Software Publishers	120
519130	Internet Publishing and Broadcasting and Web Search Portals	255
515210	Cable and Other Subscription Programming	100
517911	Telecommunications Resellers	80
517919	All Other Telecommunications	121
518210	Data Processing, Hosting, and Related Services	645
	<b>Medical Labs and Imaging Centers</b>	<b>1,712</b>
621511	Medical Laboratories	1,615
621512	Diagnostic Imaging Centers	97
	<b>Technology Equipment Distribution</b>	<b>721</b>
423420	Office Equipment Merchant Wholesalers	378
423430	Computer and Computer Peripheral Equipment and Software Merchant Wholesalers	118
423450	Medical, Dental, and Hospital Equipment and Supplies Merchant Wholesalers	225

## Appendix A: Technology Sector by NAICS Industry

NAICS	Description	2011 Jobs
<b>Technology Manufacturing</b>		<b>1,266</b>
	Alternate Power Generation	551
221111	Hydroelectric Power Generation	-
221113	Nuclear Electric Power Generation	-
221119	Other Electric Power Generation	551
Chemical & Pharmaceutical Mfg		118
325211	Plastics Material and Resin Manufacturing	-
325221	Cellulosic Organic Fiber Manufacturing	32
325311	Nitrogenous Fertilizer Manufacturing	-
325312	Phosphatic Fertilizer Manufacturing	-
325320	Pesticide and Other Agricultural Chemical Manufacturing	-
325411	Medicinal and Botanical Manufacturing	3
325412	Pharmaceutical Preparation Manufacturing	78
325413	In-Vitro Diagnostic Substance Manufacturing	3
325414	Biological Product (except Diagnostic) Manufacturing	2
Other Technology Manufacturing		109
311221	Wet Corn Milling	-
311222	Soybean Processing	-
311223	Other Oilseed Processing	5
325193	Ethyl Alcohol Manufacturing	-
325199	All Other Basic Organic Chemical Manufacturing	12
333295	Semiconductor Machinery Manufacturing	-
333311	Automatic Vending Machine Manufacturing	-
333313	Office Machinery Manufacturing	-
333314	Optical Instrument and Lens Manufacturing	20
333315	Photographic and Photocopying Equipment Manufacturing	-
333319	Other Commercial and Service Industry Machinery Manufacturing	47
334290	Other Communications Equipment Manufacturing	12
334310	Audio and Video Equipment Manufacturing	-
335921	Fiber Optic Cable Manufacturing	-
336411	Aircraft Manufacturing	-
336412	Aircraft Engine and Engine Parts Manufacturing	-
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	13
336414	Guided Missile and Space Vehicle Manufacturing	-
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing	-
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing	-
Medical Device Manufacturing		488
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing	56
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	94
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	47
334516	Analytical Laboratory Instrument Manufacturing	-
334517	Irradiation Apparatus Manufacturing	-
339112	Surgical and Medical Instrument Manufacturing	-
339113	Surgical Appliance and Supplies Manufacturing	53
339114	Dental Equipment and Supplies Manufacturing	-
339115	Ophthalmic Goods Manufacturing	37
339116	Dental Laboratories	201

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Jobs 2011	Jobs 2021	Tech Sector Growth 2011-21	Replace. 2011-21	Opening 2011-21	2011 Avg Hourly Wage
		Total Tech Occupations	24,044	27,411	3,367	5,196	8,563	\$19.25
	<b>11-0000</b>	<b>Management</b>	<b>2,396</b>	<b>2,786</b>	<b>390</b>	<b>520</b>	<b>910</b>	<b>\$30.27</b>
0	11-1011	Chief Executives	148	180	32	42	74	\$57.77
0	11-1021	General and Operations Managers	439	468	29	142	171	\$45.55
0	11-1031	Legislators	-	-	-	-	-	\$21.46
0	11-2011	Advertising and Promotions Managers	14	15	1	4	5	\$37.08
0	11-2021	Marketing Managers	125	157	32	27	59	\$33.04
0	11-2022	Sales Managers	162	207	45	35	80	\$36.28
0	11-2031	Public Relations Managers	23	20	(3)	5	2	\$34.54
0	11-3011	Administrative Services Managers	41	41	-	9	9	\$34.07
1	11-3021	Computer and Information Systems Managers	233	259	26	37	63	\$46.82
0	11-3031	Financial Managers	173	214	41	31	72	\$36.12
0	11-3041	Compensation and Benefits Managers	22	22	-	5	5	\$31.16
0	11-3042	Training and Development Managers	19	21	2	4	6	\$28.60
0	11-3049	Human Resources Managers, All Other	21	24	3	4	7	\$35.69
1	11-3051	Industrial Production Managers	24	27	3	9	12	\$36.83
0	11-3061	Purchasing Managers	18	20	2	5	7	\$35.13
0	11-3071	Transportation, Storage, and Distribution Managers	23	22	(1)	7	6	\$36.53
0	11-9011	Farm, Ranch, and Other Agricultural Managers	6	8	2	2	4	\$31.91
0	11-9012	Farmers and Ranchers	1	1	-	-	-	\$8.31
1	11-9021	Construction Managers	61	67	6	5	11	\$30.32
0	11-9031	Education Administrators, Preschool and Child Care Center/	-	-	-	-	-	\$19.31
0	11-9032	Education Administrators, Elementary and Secondary Schoc	-	-	-	-	-	\$41.96
0	11-9033	Education Administrators, Postsecondary	6	7	1	2	3	\$42.21
0	11-9039	Education Administrators, All Other	5	4	(1)	2	1	\$27.88
1	11-9041	Engineering Managers	160	168	8	33	41	\$52.95
0	11-9051	Food Service Managers	7	8	1	1	2	\$16.74
0	11-9111	Medical and Health Services Managers	63	78	15	12	27	\$45.00
1	11-9121	Natural Sciences Managers	34	35	1	11	12	\$50.77
0	11-9131	Postmasters and Mail Superintendents	-	-	-	-	-	\$29.98
0	11-9141	Property, Real Estate, and Community Association Manage	71	78	7	12	19	\$20.98
0	11-9151	Social and Community Service Managers	15	18	3	3	6	\$26.82
0	11-9199	Managers, All Other	482	617	135	124	259	\$21.70
	<b>13-0000</b>	<b>Business and Financial Operations</b>	<b>2,975</b>	<b>3,776</b>	<b>801</b>	<b>551</b>	<b>1,352</b>	<b>\$26.82</b>
0	13-1011	Agents and Business Managers of Artists, Performers, and A	18	26	8	4	12	\$17.93
0	13-1021	Purchasing Agents and Buyers, Farm Products	4	4	-	1	1	\$23.79
0	13-1022	Wholesale and Retail Buyers, Except Farm Products	11	10	(1)	3	2	\$19.86
0	13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Pro	54	62	8	14	22	\$28.83
0	13-1031	Claims Adjusters, Examiners, and Investigators	6	2	(4)	4	-	\$24.94
0	13-1032	Insurance Appraisers, Auto Damage	-	-	-	-	-	\$26.58
1	13-1041	Compliance Officers, Except Agriculture, Construction, Hea	24	30	6	3	9	\$22.36
1	13-1051	Cost Estimators	39	43	4	9	13	\$31.91
0	13-1061	Emergency Management Specialists	17	17	-	4	4	\$25.63
0	13-1071	Employment, Recruitment, and Placement Specialists	63	83	20	18	38	\$27.70
0	13-1072	Compensation, Benefits, and Job Analysis Specialists	27	32	5	7	12	\$25.53
0	13-1073	Training and Development Specialists	56	75	19	15	34	\$24.79
0	13-1079	Human Resources, Training, and Labor Relations Specialists.	19	24	5	5	10	\$28.37
0	13-1081	Logisticians	-	-	-	-	-	\$35.43
0	13-1111	Management Analysts	1,859	2,403	544	319	863	\$30.88
0	13-1121	Meeting and Convention Planners	48	66	18	11	29	\$25.28
1	13-1199	Business Operations Specialists, All Other	294	353	59	66	125	\$29.14
1	13-2011	Accountants and Auditors	297	375	78	50	128	\$26.45
0	13-2021	Appraisers and Assessors of Real Estate	14	15	1	3	4	\$18.98
0	13-2031	Budget Analysts	11	12	1	2	3	\$32.79
0	13-2041	Credit Analysts	10	12	2	2	4	\$26.86
0	13-2051	Financial Analysts	43	57	14	8	22	\$30.75
0	13-2052	Personal Financial Advisors	34	47	13	4	17	\$27.03

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	13-2053	Insurance Underwriters	6	6	-	2	2	\$24.32
0	13-2061	Financial Examiners	-	-	-	-	-	\$31.98
0	13-2071	Loan Counselors	-	-	-	-	-	\$18.75
0	13-2072	Loan Officers	11	11	-	1	1	\$27.66
0	13-2081	Tax Examiners, Collectors, and Revenue Agents	-	-	-	-	-	\$33.75
0	13-2082	Tax Preparers	8	9	1	1	2	\$21.46
1	13-2099	Financial Specialists, All Other	2	2	-	-	-	\$27.60
	<b>15-0000</b>	<b>Computer and Mathematical</b>	<b>4,413</b>	<b>4,992</b>	<b>579</b>	<b>901</b>	<b>1,480</b>	<b>\$30.43</b>
1	15-1011	Computer and Information Scientists, Research	16	16	-	3	3	\$42.87
1	15-1021	Computer Programmers	666	637	(29)	176	147	\$29.14
1	15-1031	Computer Software Engineers, Applications	664	770	106	56	162	\$34.16
1	15-1032	Computer Software Engineers, Systems Software	488	565	77	41	118	\$39.05
1	15-1041	Computer Support Specialists	612	703	91	178	269	\$22.50
1	15-1051	Computer Systems Analysts	697	730	33	150	183	\$30.50
1	15-1061	Database Administrators	124	143	19	21	40	\$31.52
1	15-1071	Network and Computer Systems Administrators	332	397	65	56	121	\$30.98
1	15-1081	Network Systems and Data Communications Analysts	692	902	210	124	334	\$27.33
1	15-1099	Computer Specialists, All Other	101	106	5	23	28	\$35.97
1	15-2011	Actuaries	-	-	-	-	-	\$46.87
1	15-2031	Operations Research Analysts	19	21	2	6	8	\$40.20
1	15-2041	Statisticians	2	2	-	1	1	\$30.09
0	15-2091	Mathematical Technicians	-	-	-	-	-	\$0.00
0	15-2099	Mathematical Science Occupations, All Other	-	-	-	-	-	\$27.13
	<b>17-0000</b>	<b>Architecture and Engineering</b>	<b>3,456</b>	<b>3,533</b>	<b>77</b>	<b>757</b>	<b>834</b>	<b>\$33.23</b>
1	17-1011	Architects, Except Landscape and Naval	475	449	(26)	104	78	\$32.39
0	17-1012	Landscape Architects	37	33	(4)	7	3	\$26.04
0	17-1021	Cartographers and Photogrammetrists	9	9	-	2	2	\$27.73
1	17-1022	Surveyors	152	148	(4)	43	39	\$23.92
1	17-2011	Aerospace Engineers	7	7	-	2	2	\$43.98
1	17-2021	Agricultural Engineers	-	-	-	-	-	\$0.00
1	17-2051	Civil Engineers	691	781	90	120	210	\$36.59
1	17-2061	Computer Hardware Engineers	35	35	-	10	10	\$36.87
1	17-2071	Electrical Engineers	203	202	(1)	50	49	\$39.92
1	17-2072	Electronics Engineers, Except Computer	81	86	5	20	25	\$39.54
1	17-2081	Environmental Engineers	59	75	16	12	28	\$41.91
1	17-2111	Health and Safety Engineers, Except Mining Safety Engineer	17	17	-	4	4	\$34.35
1	17-2112	Industrial Engineers	12	13	1	3	4	\$37.94
1	17-2121	Marine Engineers and Naval Architects	17	16	(1)	5	4	\$38.62
1	17-2131	Materials Engineers	34	38	4	8	12	\$37.64
1	17-2141	Mechanical Engineers	190	189	(1)	51	50	\$38.32
1	17-2161	Nuclear Engineers	45	52	7	10	17	\$55.68
1	17-2171	Petroleum Engineers	6	6	-	2	2	\$49.65
1	17-2199	Engineers, All Other	171	174	3	37	40	\$37.21
1	17-3011	Architectural and Civil Drafters	489	478	(11)	118	107	\$23.11
0	17-3012	Electrical and Electronics Drafters	84	86	2	22	24	\$24.01
0	17-3013	Mechanical Drafters	87	92	5	21	26	\$23.92
0	17-3019	Drafters, All Other	36	36	-	9	9	\$23.80
1	17-3022	Civil Engineering Technicians	6	6	-	1	1	\$22.65
1	17-3023	Electrical and Electronic Engineering Technicians	142	130	(12)	29	17	\$30.41
0	17-3024	Electro-Mechanical Technicians	41	39	(2)	9	7	\$20.98
1	17-3025	Environmental Engineering Technicians	32	36	4	6	10	\$20.19
1	17-3026	Industrial Engineering Technicians	26	28	2	5	7	\$24.11
1	17-3027	Mechanical Engineering Technicians	62	61	(1)	12	11	\$20.79
1	17-3029	Engineering Technicians, Except Drafters, All Other	73	74	1	14	15	\$33.05
0	17-3031	Surveying and Mapping Technicians	132	132	-	28	28	\$20.57

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
	<b>19-0000</b>	<b>Life, Physical, and Social Science</b>	<b>1,255</b>	<b>1,473</b>	<b>218</b>	<b>399</b>	<b>617</b>	<b>\$29.38</b>
1	19-1012	Food Scientists and Technologists	8	9	1	3	4	\$27.29
1	19-1013	Soil and Plant Scientists	43	55	12	15	27	\$31.99
1	19-1021	Biochemists and Biophysicists	26	36	10	8	18	\$35.09
1	19-1022	Microbiologists	29	32	3	10	13	\$28.67
1	19-1023	Zoologists and Wildlife Biologists	11	15	4	4	8	\$31.63
1	19-1029	Biological Scientists, All Other	22	28	6	7	13	\$34.01
1	19-1031	Conservation Scientists	21	24	3	2	5	\$29.21
1	19-1032	Foresters	10	10	-	1	1	\$24.22
1	19-1041	Epidemiologists	7	11	4	1	5	\$31.01
1	19-1042	Medical Scientists, Except Epidemiologists	164	202	38	34	72	\$31.36
1	19-2011	Astronomers	-	-	-	-	-	\$0.00
1	19-2012	Physicists	22	23	1	6	7	\$48.41
1	19-2031	Chemists	39	33	(6)	15	9	\$29.81
1	19-2032	Materials Scientists	15	17	2	5	7	\$44.37
1	19-2041	Environmental Scientists and Specialists, Including Health	131	158	27	37	64	\$31.81
1	19-2042	Geoscientists, Except Hydrologists and Geographers	69	80	11	20	31	\$36.69
1	19-2043	Hydrologists	4	3	(1)	1	-	\$38.86
0	19-2099	Physical Scientists, All Other	41	51	10	11	21	\$36.42
0	19-3011	Economists	4	4	-	1	1	\$43.05
0	19-3021	Market Research Analysts	138	173	35	37	72	\$26.29
0	19-3022	Survey Researchers	24	34	10	7	17	\$17.81
1	19-3031	Clinical, Counseling, and School Psychologists	39	48	9	11	20	\$31.90
1	19-3032	Industrial-Organizational Psychologists	14	17	3	4	7	\$42.74
1	19-3039	Psychologists, All Other	16	19	3	5	8	\$36.17
0	19-3051	Urban and Regional Planners	56	62	6	11	17	\$31.91
0	19-3091	Anthropologists and Archeologists	39	52	13	19	32	\$25.82
0	19-3092	Geographers	8	11	3	4	7	\$35.95
0	19-3093	Historians	5	7	2	3	5	\$23.32
1	19-3099	Social Scientists and Related Workers, All Other	10	13	3	5	8	\$36.55
1	19-4011	Agricultural and Food Science Technicians	10	10	-	4	4	\$17.92
1	19-4021	Biological Technicians	88	86	(2)	32	30	\$16.31
1	19-4031	Chemical Technicians	28	28	-	6	6	\$27.12
0	19-4041	Geological and Petroleum Technicians	23	25	2	8	10	\$30.10
1	19-4051	Nuclear Technicians	9	11	2	3	5	\$35.21
0	19-4061	Social Science Research Assistants	16	15	(1)	7	6	\$21.97
1	19-4091	Environmental Science and Protection Technicians, Including	12	14	2	5	7	\$21.26
0	19-4092	Forensic Science Technicians	16	20	4	7	11	\$26.66
1	19-4093	Forest and Conservation Technicians	4	4	-	2	2	\$18.39
1	19-4099	Life, Physical, and Social Science Technicians, All Other	26	25	(1)	12	11	\$25.33
	<b>21-0000</b>	<b>Community and Social Services</b>	<b>88</b>	<b>99</b>	<b>11</b>	<b>19</b>	<b>30</b>	<b>\$21.73</b>
0	21-1011	Substance Abuse and Behavioral Disorder Counselors	12	16	4	2	6	\$25.71
0	21-1012	Educational, Vocational, and School Counselors	16	21	5	3	8	\$26.10
0	21-1013	Marriage and Family Therapists	2	2	-	-	-	\$26.54
0	21-1014	Mental Health Counselors	5	7	2	1	3	\$18.75
0	21-1015	Rehabilitation Counselors	1	1	-	-	-	\$17.84
0	21-1019	Counselors, All Other	3	3	-	1	1	\$23.38
0	21-1021	Child, Family, and School Social Workers	1	1	-	-	-	\$23.75
0	21-1022	Medical and Public Health Social Workers	6	6	-	2	2	\$28.03
0	21-1023	Mental Health and Substance Abuse Social Workers	3	3	-	1	1	\$24.28
0	21-1029	Social Workers, All Other	3	3	-	1	1	\$25.92
0	21-1091	Health Educators	4	4	-	1	1	\$24.19
0	21-1092	Probation Officers and Correctional Treatment Specialists	-	-	-	-	-	\$26.74
0	21-1093	Social and Human Service Assistants	9	7	(2)	2	-	\$16.13
0	21-1099	Community and Social Service Specialists, All Other	20	22	2	4	6	\$23.42
0	21-2011	Clergy	3	3	-	1	1	\$20.64
0	21-2021	Directors, Religious Activities and Education	-	-	-	-	-	\$13.74
0	21-2099	Religious Workers, All Other	-	-	-	-	-	\$17.24

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
	<b>23-0000</b>	<b>Legal</b>	<b>30</b>	<b>33</b>	<b>3</b>	<b>5</b>	<b>8</b>	<b>\$35.32</b>
0	23-1011	Lawyers	15	18	3	3	6	\$43.23
0	23-1021	Administrative Law Judges, Adjudicators, and Hearing Office	-	-	-	-	-	\$41.22
0	23-1022	Arbitrators, Mediators, and Conciliators	-	-	-	-	-	\$25.62
0	23-2011	Paralegals and Legal Assistants	2	2	-	-	-	\$23.13
0	23-2091	Court Reporters	2	2	-	-	-	\$23.86
0	23-2092	Law Clerks	1	1	-	-	-	\$23.32
0	23-2093	Title Examiners, Abstractors, and Searchers	5	5	-	1	1	\$21.84
0	23-2099	Legal Support Workers, All Other	5	5	-	1	1	\$23.63
	<b>25-0000</b>	<b>Education, Training, and Library</b>	<b>776</b>	<b>716</b>	<b>(60)</b>	<b>170</b>	<b>110</b>	<b>\$23.39</b>
0	25-1099	Postsecondary teachers	327	366	39	57	96	\$30.49
0	25-2011	Preschool Teachers, Except Special Education	17	20	3	4	7	\$14.70
0	25-2012	Kindergarten Teachers, Except Special Education	1	1	-	-	-	\$20.92
0	25-2021	Elementary School Teachers, Except Special Education	46	6	(40)	40	-	\$23.39
0	25-2022	Middle School Teachers, Except Special and Vocational Edu	2	2	-	-	-	\$18.39
0	25-2023	Vocational Education Teachers, Middle School	-	-	-	-	-	\$26.24
0	25-2031	Secondary School Teachers, Except Special and Vocational I	195	106	(89)	89	-	\$23.36
0	25-2032	Vocational Education Teachers, Secondary School	-	-	-	-	-	\$21.50
0	25-2041	Special Education Teachers, Preschool, Kindergarten, and E	-	-	-	-	-	\$23.61
0	25-2042	Special Education Teachers, Middle School	-	-	-	-	-	\$25.26
0	25-2043	Special Education Teachers, Secondary School	-	-	-	-	-	\$25.49
0	25-3011	Adult Literacy, Remedial Education, and GED Teachers and	46	52	6	7	13	\$20.56
0	25-3021	Self-Enrichment Education Teachers	67	67	-	10	10	\$19.23
0	25-3099	Teachers and Instructors, All Other	42	52	10	6	16	\$23.50
0	25-4011	Archivists	-	-	-	-	-	\$24.93
0	25-4012	Curators	-	-	-	-	-	\$25.14
0	25-4013	Museum Technicians and Conservators	-	-	-	-	-	\$17.61
0	25-4021	Librarians	-	-	-	-	-	\$29.26
0	25-4031	Library Technicians	-	-	-	-	-	\$17.67
0	25-9011	Audio-Visual Collections Specialists	-	-	-	-	-	\$20.42
0	25-9021	Farm and Home Management Advisors	12	18	6	3	9	\$21.50
0	25-9031	Instructional Coordinators	15	21	6	3	9	\$27.50
0	25-9041	Teacher Assistants	5	4	(1)	1	-	\$12.09
0	25-9099	Education, Training, and Library Workers, All Other	1	1	-	-	-	\$17.41
	<b>27-0000</b>	<b>Arts, Design, Entertainment, Sports, and Media</b>	<b>728</b>	<b>814</b>	<b>86</b>	<b>184</b>	<b>270</b>	<b>\$18.37</b>
0	27-1011	Art Directors	9	9	-	2	2	\$16.65
0	27-1012	Craft Artists	-	-	-	-	-	\$7.56
0	27-1013	Fine Artists, Including Painters, Sculptors, and Illustrators	3	3	-	1	1	\$10.09
0	27-1014	Multi-Media Artists and Animators	20	24	4	6	10	\$12.01
0	27-1019	Artists and Related Workers, All Other	-	-	-	-	-	\$10.62
0	27-1021	Commercial and Industrial Designers	12	14	2	4	6	\$22.06
0	27-1022	Fashion Designers	-	-	-	-	-	\$24.03
0	27-1023	Floral Designers	1	1	-	-	-	\$10.70
1	27-1024	Graphic Designers	115	133	18	35	53	\$18.07
0	27-1025	Interior Designers	56	52	(4)	17	13	\$18.26
0	27-1026	Merchandise Displayers and Window Trimmers	12	13	1	4	5	\$12.96
0	27-1027	Set and Exhibit Designers	-	-	-	-	-	\$20.35
0	27-1029	Designers, All Other	52	54	2	16	18	\$21.90
0	27-2011	Actors	-	-	-	-	-	\$28.12
0	27-2012	Producers and Directors	5	6	1	2	3	\$24.58
0	27-2021	Athletes and Sports Competitors	-	-	-	-	-	\$38.66
0	27-2022	Coaches and Scouts	11	14	3	2	5	\$15.27
0	27-2023	Umpires, Referees, and Other Sports Officials	7	8	1	1	2	\$13.79
0	27-2031	Dancers	-	-	-	-	-	\$14.58
0	27-2032	Choreographers	-	-	-	-	-	\$26.98

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	27-2041	Music Directors and Composers	-	-	-	-	-	\$21.03
0	27-2042	Musicians and Singers	-	-	-	-	-	\$21.61
0	27-2099	Entertainers and Performers, Sports and Related Workers, <sup>A</sup>	16	17	1	4	5	\$21.99
0	27-3011	Radio and Television Announcers	9	8	(1)	3	2	\$13.51
0	27-3012	Public Address System and Other Announcers	-	-	-	-	-	\$17.43
0	27-3021	Broadcast News Analysts	4	4	-	1	1	\$23.23
0	27-3022	Reporters and Correspondents	1	1	-	-	-	\$18.24
0	27-3031	Public Relations Specialists	70	81	11	17	28	\$26.07
0	27-3041	Editors	45	61	16	12	28	\$20.43
0	27-3042	Technical Writers	75	88	13	12	25	\$20.57
0	27-3043	Writers and Authors	74	94	20	17	37	\$17.54
0	27-3091	Interpreters and Translators	17	19	2	4	6	\$18.51
0	27-3099	Media and Communication Workers, All Other	19	20	1	4	5	\$20.70
0	27-4011	Audio and Video Equipment Technicians	23	25	2	7	9	\$19.15
0	27-4012	Broadcast Technicians	16	17	1	5	6	\$12.03
0	27-4014	Sound Engineering Technicians	11	10	(1)	3	2	\$21.87
0	27-4021	Photographers	20	21	1	4	5	\$15.52
0	27-4031	Camera Operators, Television, Video, and Motion Picture	10	8	(2)	3	1	\$20.71
0	27-4032	Film and Video Editors	-	-	-	-	-	\$22.93
0	27-4099	Media and Communication Equipment Workers, All Other	15	9	(6)	6	-	\$29.18
	<b>29-0000</b>	<b>Healthcare Practitioners and Technical</b>	<b>991</b>	<b>1,248</b>	<b>257</b>	<b>202</b>	<b>459</b>	<b>\$41.03</b>
0	29-1011	Chiropractors	2	2	-	-	-	\$27.07
0	29-1021	Dentists, General	13	17	4	5	9	\$67.62
0	29-1029	Dentists, All Other Specialists	-	-	-	-	-	\$96.12
1	29-1031	Dietitians and Nutritionists	23	26	3	8	11	\$31.98
0	29-1041	Optometrists	23	17	(6)	8	2	\$43.40
0	29-1051	Pharmacists	26	33	7	6	13	\$50.95
0	29-1061	Anesthesiologists	39	47	8	7	15	\$91.52
0	29-1062	Family and General Practitioners	24	29	5	4	9	\$73.61
0	29-1063	Internists, General	15	20	5	3	8	\$76.98
0	29-1064	Obstetricians and Gynecologists	-	-	-	-	-	\$82.67
0	29-1065	Pediatricians, General	2	2	-	-	-	\$80.57
0	29-1066	Psychiatrists	38	57	19	7	26	\$70.73
0	29-1067	Surgeons	23	28	5	4	9	\$92.71
0	29-1069	Physicians and Surgeons, All Other	31	46	15	6	21	\$84.28
0	29-1071	Physician Assistants	14	14	-	3	3	\$39.48
0	29-1081	Podiatrists	-	-	-	-	-	\$37.68
0	29-1111	Registered Nurses	98	96	(2)	17	15	\$38.30
0	29-1121	Audiologists	-	-	-	-	-	\$42.06
0	29-1122	Occupational Therapists	2	2	-	-	-	\$33.96
0	29-1123	Physical Therapists	5	4	(1)	1	-	\$28.16
0	29-1125	Recreational Therapists	-	-	-	-	-	\$22.51
0	29-1126	Respiratory Therapists	-	-	-	-	-	\$29.53
0	29-1127	Speech-Language Pathologists	5	5	-	1	1	\$29.25
0	29-1129	Therapists, All Other	7	7	-	1	1	\$27.26
0	29-1131	Veterinarians	14	19	5	2	7	\$44.69
0	29-1199	Health Diagnosing and Treating Practitioners, All Other	2	2	-	-	-	\$27.50
0	29-2011	Medical and Clinical Laboratory Technologists	174	241	67	33	100	\$28.92
0	29-2012	Medical and Clinical Laboratory Technicians	177	249	72	34	106	\$20.09
0	29-2021	Dental Hygienists	-	-	-	-	-	\$32.00
0	29-2031	Cardiovascular Technologists and Technicians	4	4	-	1	1	\$26.52
0	29-2032	Diagnostic Medical Sonographers	25	30	5	4	9	\$35.64
1	29-2033	Nuclear Medicine Technologists	4	4	-	1	1	\$35.86
0	29-2034	Radiologic Technologists and Technicians	158	196	38	23	61	\$30.71
0	29-2041	Emergency Medical Technicians and Paramedics	17	19	2	4	6	\$22.78

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
1	29-2051	Dietetic Technicians	-	-	-	-	-	\$13.79
0	29-2052	Pharmacy Technicians	4	10	6	1	7	\$16.90
0	29-2053	Psychiatric Technicians	-	-	-	-	-	\$20.12
0	29-2054	Respiratory Therapy Technicians	-	-	-	-	-	\$31.16
0	29-2055	Surgical Technologists	-	-	-	-	-	\$22.20
0	29-2056	Veterinary Technologists and Technicians	4	4	-	1	1	\$14.17
0	29-2061	Licensed Practical and Licensed Vocational Nurses	3	3	-	1	1	\$21.48
0	29-2071	Medical Records and Health Information Technicians	-	-	-	-	-	\$19.88
0	29-2081	Opticians, Dispensing	-	-	-	-	-	\$19.12
0	29-2091	Orthotists and Prosthetists	2	1	(1)	1	-	\$62.00
0	29-2099	Health Technologists and Technicians, All Other	6	7	1	1	2	\$29.29
0	29-9011	Occupational Health and Safety Specialists	4	4	-	1	1	\$33.75
0	29-9091	Athletic Trainers	-	-	-	-	-	\$22.31
0	29-9099	Healthcare Practitioners and Technical Workers, All Other	3	3	-	1	1	\$30.45
	<b>31-0000</b>	<b>Healthcare Support</b>	<b>404</b>	<b>474</b>	<b>70</b>	<b>48</b>	<b>118</b>	<b>\$14.56</b>
0	31-1011	Home Health Aides	5	6	1	0	1	\$11.87
0	31-1012	Nursing Aides, Orderlies, and Attendants	61	64	3	6	9	\$14.62
0	31-1013	Psychiatric Aides	-	-	-	-	-	\$15.24
0	31-2011	Occupational Therapist Assistants	-	-	-	-	-	\$21.15
0	31-2012	Occupational Therapist Aides	-	-	-	-	-	\$12.33
0	31-2021	Physical Therapist Assistants	6	6	-	1	1	\$17.99
0	31-2022	Physical Therapist Aides	2	2	-	-	-	\$15.05
0	31-9011	Massage Therapists	5	5	-	1	1	\$14.89
0	31-9091	Dental Assistants	-	-	-	-	-	\$14.49
0	31-9092	Medical Assistants	49	59	10	5	15	\$15.50
0	31-9093	Medical Equipment Preparers	23	25	2	3	5	\$16.50
0	31-9094	Medical Transcriptionists	28	34	6	3	9	\$17.14
0	31-9095	Pharmacy Aides	4	3	(1)	1	-	\$11.07
0	31-9096	Veterinary Assistants and Laboratory Animal Caretakers	32	37	5	4	9	\$10.86
0	31-9099	Healthcare Support Workers, All Other	189	233	44	21	65	\$14.89
	<b>33-0000</b>	<b>Protective Service</b>	<b>47</b>	<b>64</b>	<b>17</b>	<b>13</b>	<b>30</b>	<b>\$18.90</b>
0	33-1011	First-Line Supervisors/Managers of Correctional Officers	-	-	-	-	-	\$34.02
0	33-1012	First-Line Supervisors/Managers of Police and Detectives	-	-	-	-	-	\$38.54
0	33-1021	First-Line Supervisors/Managers of Fire Fighting and Prevention	-	-	-	-	-	\$37.38
0	33-1099	First-Line Supervisors/Managers, Protective Service Workers	1	1	-	-	-	\$19.32
0	33-2011	Fire Fighters	7	7	-	2	2	\$25.41
0	33-2021	Fire Inspectors and Investigators	4	6	2	1	3	\$21.37
0	33-3011	Bailiffs	-	-	-	-	-	\$16.70
0	33-3012	Correctional Officers and Jailers	-	-	-	-	-	\$22.68
0	33-3021	Detectives and Criminal Investigators	-	-	-	-	-	\$36.84
0	33-3041	Parking Enforcement Workers	-	-	-	-	-	\$16.27
0	33-3051	Police and Sheriff's Patrol Officers	-	-	-	-	-	\$26.01
0	33-9011	Animal Control Workers	8	18	10	3	13	\$13.15
0	33-9021	Private Detectives and Investigators	6	8	2	1	3	\$23.07
0	33-9032	Security Guards	16	21	5	3	8	\$12.73
0	33-9091	Crossing Guards	2	-	(2)	2	-	\$12.08
0	33-9092	Lifeguards, Ski Patrol, and Other Recreational Protective Services	3	3	-	2	2	\$17.77
0	33-9099	Protective Service Workers, All Other	-	-	-	-	-	\$16.03
	<b>35-0000</b>	<b>Food Preparation and Serving Related</b>	<b>25</b>	<b>33</b>	<b>8</b>	<b>9</b>	<b>17</b>	<b>\$11.96</b>
0	35-1011	Chefs and Head Cooks	4	4	-	-	-	\$22.51
1	35-1012	First-Line Supervisors/Managers of Food Preparation and Serving	18	29	11	2	13	\$16.66
0	35-2011	Cooks, Fast Food	-	-	-	-	-	\$9.62
1	35-2012	Cooks, Institution and Cafeteria	-	-	-	-	-	\$15.75
0	35-2014	Cooks, Restaurant	-	-	-	-	-	\$14.55
0	35-2015	Cooks, Short Order	-	-	-	-	-	\$12.18



## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	35-2019	Cooks, All Other	-	-	-	-	-	\$13.34
0	35-2021	Food Preparation Workers	3	-	(3)	3	-	\$10.46
0	35-3011	Bartenders	-	-	-	-	-	\$13.83
0	35-3021	Combined Food Preparation and Serving Workers, Including	-	-	-	-	-	\$9.72
0	35-3022	Counter Attendants, Cafeteria, Food Concession, and Coffee	-	-	-	-	-	\$10.32
0	35-3031	Waiters and Waitresses	-	-	-	-	-	\$11.89
0	35-3041	Food Servers, Nonrestaurant	-	-	-	-	-	\$13.71
0	35-9011	Dining Room and Cafeteria Attendants and Bartender Help	-	-	-	-	-	\$11.45
0	35-9021	Dishwashers	-	-	-	-	-	\$10.68
0	35-9031	Hosts and Hostesses, Restaurant, Lounge, and Coffee Shop	-	-	-	-	-	\$10.25
0	35-9099	Food Preparation and Serving Related Workers, All Other	-	-	-	-	-	\$16.52
	<b>37-0000</b>	<b>Building and Grounds Cleaning and Maintenance</b>	<b>395</b>	<b>393</b>	<b>(2)</b>	<b>66</b>	<b>64</b>	<b>\$13.13</b>
0	37-1011	First-Line Supervisors/Managers of Housekeeping and Janitor	112	101	(11)	12	1	\$16.91
0	37-1012	First-Line Supervisors/Managers of Landscaping, Lawn Servi	23	24	1	2	3	\$24.35
0	37-2011	Janitors and Cleaners, Except Maids and Housekeeping Clea	128	136	8	24	32	\$12.45
0	37-2012	Maids and Housekeeping Cleaners	35	31	(4)	6	2	\$11.71
0	37-2019	Building Cleaning Workers, All Other	11	12	1	2	3	\$13.41
0	37-2021	Pest Control Workers	8	8	-	3	3	\$17.73
0	37-3011	Landscaping and Groundskeeping Workers	77	81	4	9	13	\$13.92
0	37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation	-	-	-	-	-	\$15.46
0	37-3013	Tree Trimmers and Pruners	1	-	(1)	1	-	\$16.95
0	37-3019	Grounds Maintenance Workers, All Other	-	-	-	-	-	\$15.62
	<b>39-0000</b>	<b>Personal Care and Service</b>	<b>40</b>	<b>37</b>	<b>(3)</b>	<b>10</b>	<b>7</b>	<b>\$11.50</b>
0	39-1011	Gaming Supervisors	-	-	-	-	-	\$13.79
0	39-1012	Slot Key Persons	-	-	-	-	-	\$8.04
0	39-1021	First-Line Supervisors/Managers of Personal Service Work	-	-	-	-	-	\$15.21
0	39-2011	Animal Trainers	2	2	-	-	-	\$10.17
0	39-2021	Nonfarm Animal Caretakers	1	1	-	-	-	\$11.17
0	39-3011	Gaming Dealers	-	-	-	-	-	\$10.15
0	39-3012	Gaming and Sports Book Writers and Runners	-	-	-	-	-	\$18.43
0	39-3019	Gaming Service Workers, All Other	-	-	-	-	-	\$19.83
0	39-3021	Motion Picture Projectionists	-	-	-	-	-	\$15.33
0	39-3031	Ushers, Lobby Attendants, and Ticket Takers	2	-	(2)	2	-	\$9.20
0	39-3091	Amusement and Recreation Attendants	-	-	-	-	-	\$12.68
0	39-3093	Locker Room, Coatroom, and Dressing Room Attendants	-	-	-	-	-	\$10.68
0	39-3099	Entertainment Attendants and Related Workers, All Other	6	3	(3)	3	-	\$8.41
0	39-4011	Embalmers	-	-	-	-	-	\$20.99
0	39-4021	Funeral Attendants	-	-	-	-	-	\$13.75
0	39-5011	Barbers	-	-	-	-	-	\$10.34
0	39-5012	Hairdressers, Hairstylists, and Cosmetologists	3	2	(1)	1	-	\$14.15
0	39-5091	Makeup Artists, Theatrical and Performance	1	1	-	-	-	\$19.18
0	39-5092	Manicurists and Pedicurists	-	-	-	-	-	\$9.94
0	39-5093	Shampooers	-	-	-	-	-	\$8.35
0	39-5094	Skin Care Specialists	1	1	-	-	-	\$16.27
0	39-6011	Baggage Porters and Bellhops	-	-	-	-	-	\$11.56
0	39-6012	Concierges	4	6	2	1	3	\$16.63
0	39-6021	Tour Guides and Escorts	1	1	-	-	-	\$13.25
0	39-6022	Travel Guides	-	-	-	-	-	\$25.90
0	39-6031	Flight Attendants	-	-	-	-	-	\$14.17
0	39-6032	Transportation Attendants, Except Flight Attendants and B	-	-	-	-	-	\$12.39
0	39-9011	Child Care Workers	3	3	-	1	1	\$7.05
0	39-9021	Personal and Home Care Aides	10	12	2	1	3	\$9.62
0	39-9031	Fitness Trainers and Aerobics Instructors	3	3	-	1	1	\$17.81
0	39-9032	Recreation Workers	-	-	-	-	-	\$15.70
0	39-9041	Residential Advisors	-	-	-	-	-	\$14.46
0	39-9099	Personal Care and Service Workers, All Other	3	2	(1)	1	-	\$12.80

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector				2011 Avg Hourly Wage	
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21		Opening 2011-21
	<b>41-0000</b>	<b>Sales and Related</b>	<b>1,269</b>	<b>1,468</b>	<b>199</b>	<b>342</b>	<b>541</b>	<b>\$15.29</b>
0	41-1011	First-Line Supervisors/Managers of Retail Sales Workers	61	81	20	13	33	\$16.48
0	41-1012	First-Line Supervisors/Managers of Non-Retail Sales Workers	74	82	8	16	24	\$18.92
0	41-2011	Cashiers	9	14	5	4	9	\$10.41
0	41-2012	Gaming Change Persons and Booth Cashiers	-	-	-	-	-	\$11.27
0	41-2021	Counter and Rental Clerks	6	4	(2)	2	-	\$12.42
0	41-2022	Parts Salespersons	11	12	1	4	5	\$15.65
0	41-2031	Retail Salespersons	33	25	(8)	9	1	\$12.56
0	41-3011	Advertising Sales Agents	27	36	9	6	15	\$23.51
0	41-3021	Insurance Sales Agents	3	3	-	1	1	\$21.33
0	41-3031	Securities, Commodities, and Financial Services Sales Agents	19	22	3	6	9	\$22.57
0	41-3041	Travel Agents	4	4	-	1	1	\$14.35
0	41-3099	Sales Representatives, Services, All Other	409	500	91	101	192	\$24.76
0	41-4011	Sales Representatives, Wholesale and Manufacturing, Techn	241	259	18	56	74	\$24.60
0	41-4012	Sales Representatives, Wholesale and Manufacturing, Excep	172	182	10	40	50	\$20.87
0	41-9011	Demonstrators and Product Promoters	24	32	8	8	16	\$11.52
0	41-9012	Models	-	-	-	-	-	\$15.99
0	41-9021	Real Estate Brokers	5	7	2	1	3	\$22.84
0	41-9022	Real Estate Sales Agents	8	10	2	1	3	\$15.31
0	41-9031	Sales Engineers	45	54	9	16	25	\$45.36
0	41-9041	Telemarketers	45	55	10	18	28	\$11.98
0	41-9091	Door-to-Door Sales Workers, News and Street Vendors, and	6	6	-	2	2	\$7.47
0	41-9099	Sales and Related Workers, All Other	67	80	13	15	28	\$21.10
	<b>43-0000</b>	<b>Office and Administrative Support</b>	<b>2,638</b>	<b>2,994</b>	<b>356</b>	<b>601</b>	<b>957</b>	<b>\$16.42</b>
0	43-1011	First-Line Supervisors/Managers of Office and Administrativ	203	228	25	46	71	\$23.58
0	43-2011	Switchboard Operators, Including Answering Service	7	6	(1)	2	1	\$14.79
0	43-2021	Telephone Operators	3	2	(1)	1	-	\$15.40
0	43-3011	Bill and Account Collectors	38	43	5	7	12	\$17.20
0	43-3021	Billing and Posting Clerks and Machine Operators	82	92	10	13	23	\$15.73
0	43-3031	Bookkeeping, Accounting, and Auditing Clerks	240	275	35	29	64	\$16.54
0	43-3051	Payroll and Timekeeping Clerks	19	20	1	7	8	\$17.99
0	43-3061	Procurement Clerks	21	22	1	7	8	\$18.97
0	43-3071	Tellers	1	-	(1)	1	-	\$12.26
0	43-4011	Brokerage Clerks	7	7	-	4	4	\$18.76
0	43-4021	Correspondence Clerks	2	2	-	1	1	\$18.91
0	43-4031	Court, Municipal, and License Clerks	21	23	2	6	8	\$20.69
0	43-4041	Credit Authorizers, Checkers, and Clerks	7	9	2	6	8	\$17.94
0	43-4051	Customer Service Representatives	241	290	49	76	125	\$15.60
0	43-4061	Eligibility Interviewers, Government Programs	8	8	-	2	2	\$21.85
0	43-4071	File Clerks	19	18	(1)	11	10	\$13.50
0	43-4081	Hotel, Motel, and Resort Desk Clerks	-	-	-	-	-	\$16.31
0	43-4111	Interviewers, Except Eligibility and Loan	28	29	1	7	8	\$15.57
0	43-4121	Library Assistants, Clerical	7	9	2	3	5	\$14.54
0	43-4131	Loan Interviewers and Clerks	12	13	1	3	4	\$16.70
0	43-4141	New Accounts Clerks	2	2	-	1	1	\$14.62
0	43-4151	Order Clerks	23	26	3	13	16	\$14.28
0	43-4161	Human Resources Assistants, Except Payroll and Timekeepi	6	6	-	2	2	\$18.00
0	43-4171	Receptionists and Information Clerks	89	115	26	24	50	\$14.52
0	43-4181	Reservation and Transportation Ticket Agents and Travel C	14	26	12	4	16	\$14.47
0	43-4199	Information and Record Clerks, All Other	2	2	-	1	1	\$18.71
0	43-5011	Cargo and Freight Agents	-	-	-	-	-	\$14.89
0	43-5021	Couriers and Messengers	81	101	20	19	39	\$14.56
0	43-5031	Police, Fire, and Ambulance Dispatchers	13	15	2	3	5	\$20.59
0	43-5032	Dispatchers, Except Police, Fire, and Ambulance	11	10	(1)	3	2	\$15.73
0	43-5041	Meter Readers, Utilities	16	20	4	6	10	\$21.68

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	43-5051	Postal Service Clerks	-	-	-	-	-	\$24.67
0	43-5052	Postal Service Mail Carriers	-	-	-	-	-	\$24.63
0	43-5053	Postal Service Mail Sorters, Processors, and Processing Mac	-	-	-	-	-	\$22.93
0	43-5061	Production, Planning, and Expediting Clerks	16	19	3	4	7	\$22.49
0	43-5071	Shipping, Receiving, and Traffic Clerks	30	29	(1)	10	9	\$15.16
0	43-5081	Stock Clerks and Order Fillers	38	40	2	9	11	\$12.05
0	43-5111	Weighers, Measurers, Checkers, and Samplers, Recordkeepin	10	9	(1)	5	4	\$14.80
0	43-6011	Executive Secretaries and Administrative Assistants	320	366	46	43	89	\$21.80
0	43-6012	Legal Secretaries	6	6	-	2	2	\$21.10
0	43-6013	Medical Secretaries	60	68	8	8	16	\$16.78
0	43-6014	Secretaries, Except Legal, Medical, and Executive	221	241	20	35	55	\$16.94
0	43-9011	Computer Operators	31	33	2	13	15	\$20.70
0	43-9021	Data Entry Keyers	148	177	29	43	72	\$15.53
0	43-9022	Word Processors and Typists	45	45	-	6	6	\$14.76
0	43-9031	Desktop Publishers	13	13	-	2	2	\$22.12
0	43-9041	Insurance Claims and Policy Processing Clerks	10	10	-	1	1	\$16.88
0	43-9051	Mail Clerks and Mail Machine Operators, Except Postal Ser	20	18	(2)	6	4	\$12.92
0	43-9061	Office Clerks, General	375	426	51	51	102	\$13.75
0	43-9071	Office Machine Operators, Except Computer	17	17	-	9	9	\$13.42
0	43-9081	Proofreaders and Copy Markers	13	13	-	2	2	\$13.10
1	43-9111	Statistical Assistants	7	7	-	1	1	\$18.23
0	43-9199	Office and Administrative Support Workers, All Other	35	38	3	12	15	\$15.65
<b>45-0000 Farming, Fishing, and Forestry</b>			-	-	-	-	-	<b>\$13.74</b>
1	45-1011	First-Line Supervisors/Managers of Farming, Fishing, and Fo	-	-	-	-	-	\$22.16
0	45-1012	Farm Labor Contractors	-	-	-	-	-	\$14.92
0	45-2011	Agricultural Inspectors	-	-	-	-	-	\$21.54
1	45-2021	Animal Breeders	-	-	-	-	-	\$16.43
0	45-2041	Graders and Sorters, Agricultural Products	-	-	-	-	-	\$15.90
0	45-2091	Agricultural Equipment Operators	-	-	-	-	-	\$16.40
0	45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	-	-	-	-	-	\$12.27
0	45-2093	Farmworkers, Farm and Ranch Animals	-	-	-	-	-	\$12.00
0	45-2099	Agricultural Workers, All Other	-	-	-	-	-	\$17.55
1	45-3011	Fishers and Related Fishing Workers	-	-	-	-	-	\$13.74
0	45-3021	Hunters and Trappers	-	-	-	-	-	\$18.78
1	45-4011	Forest and Conservation Workers	-	-	-	-	-	\$16.48
1	45-4021	Fallers	-	-	-	-	-	\$14.44
1	45-4022	Logging Equipment Operators	-	-	-	-	-	\$14.48
<b>47-0000 Construction and Extraction</b>			<b>575</b>	<b>589</b>	<b>14</b>	<b>100</b>	<b>114</b>	<b>\$24.61</b>
0	47-1011	First-Line Supervisors/Managers of Construction Trades and	18	19	1	4	5	\$28.84
0	47-2021	Brickmasons and Blockmasons	-	-	-	-	-	\$23.86
0	47-2022	Stonemasons	3	3	-	1	1	\$22.48
0	47-2031	Carpenters	45	45	-	6	6	\$25.92
0	47-2041	Carpet Installers	-	-	-	-	-	\$18.56
0	47-2042	Floor Layers, Except Carpet, Wood, and Hard Tiles	6	5	(1)	2	1	\$21.31
0	47-2043	Floor Sanders and Finishers	-	-	-	-	-	\$17.04
0	47-2044	Tile and Marble Setters	35	31	(4)	9	5	\$23.96
0	47-2051	Cement Masons and Concrete Finishers	5	3	(2)	2	-	\$27.70
0	47-2053	Terrazzo Workers and Finishers	-	-	-	-	-	\$19.53
0	47-2061	Construction Laborers	27	28	1	2	3	\$20.62
0	47-2071	Paving, Surfacing, and Tamping Equipment Operators	-	-	-	-	-	\$30.19
0	47-2073	Operating Engineers and Other Construction Equipment Op	16	16	-	3	3	\$31.25
0	47-2081	Drywall and Ceiling Tile Installers	-	-	-	-	-	\$24.85
0	47-2082	Tapers	-	-	-	-	-	\$27.97
0	47-2111	Electricians	89	86	(3)	23	20	\$29.72
0	47-2121	Glaziers	-	-	-	-	-	\$21.86

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	47-2131	Insulation Workers, Floor, Ceiling, and Wall	1	-	(1)	1	-	\$20.09
0	47-2132	Insulation Workers, Mechanical	-	-	-	-	-	\$23.87
0	47-2141	Painters, Construction and Maintenance	5	4	(1)	1	-	\$19.30
0	47-2142	Paperhangers	-	-	-	-	-	\$18.08
0	47-2151	Pipelayers	-	-	-	-	-	\$16.77
0	47-2152	Plumbers, Pipefitters, and Steamfitters	45	52	7	9	16	\$25.40
0	47-2161	Plasterers and Stucco Masons	-	-	-	-	-	\$22.68
0	47-2171	Reinforcing Iron and Rebar Workers	-	-	-	-	-	\$26.56
0	47-2181	Roofers	2	2	-	-	-	\$20.90
0	47-2211	Sheet Metal Workers	40	43	3	10	13	\$26.09
0	47-2221	Structural Iron and Steel Workers	2	2	-	-	-	\$23.81
0	47-3011	Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile	-	-	-	-	-	\$19.73
0	47-3012	Helpers--Carpenters	7	5	(2)	2	-	\$18.67
0	47-3013	Helpers--Electricians	8	8	-	2	2	\$17.85
0	47-3014	Helpers--Painters, Paperhangers, Plasterers, and Stucco Mas	-	-	-	-	-	\$13.15
0	47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters	2	2	-	-	-	\$15.79
0	47-3016	Helpers--Roofers	-	-	-	-	-	\$12.80
0	47-3019	Helpers, Construction Trades, All Other	5	4	(1)	1	-	\$16.35
0	47-4011	Construction and Building Inspectors	171	185	14	35	49	\$26.05
0	47-4021	Elevator Installers and Repairers	-	-	-	-	-	\$37.82
0	47-4031	Fence Erectors	-	-	-	-	-	\$15.24
0	47-4041	Hazardous Materials Removal Workers	8	7	(1)	2	1	\$19.75
0	47-4051	Highway Maintenance Workers	-	-	-	-	-	\$22.25
0	47-4061	Rail-Track Laying and Maintenance Equipment Operators	16	17	1	5	6	\$31.78
0	47-4071	Septic Tank Servicers and Sewer Pipe Cleaners	-	-	-	-	-	\$17.73
0	47-4099	Construction and Related Workers, All Other	-	-	-	-	-	\$21.62
0	47-5021	Earth Drillers, Except Oil and Gas	10	11	1	2	3	\$21.79
0	47-5031	Explosives Workers, Ordnance Handling Experts, and Blast	-	-	-	-	-	\$27.49
0	47-5081	Helpers--Extraction Workers	9	11	2	2	4	\$15.87
0	47-5099	Extraction Workers, All Other	-	-	-	-	-	\$18.77
	<b>49-0000</b>	<b>Installation, Maintenance, and Repair</b>	<b>508</b>	<b>512</b>	<b>4</b>	<b>106</b>	<b>110</b>	<b>\$21.15</b>
0	49-1011	First-Line Supervisors/Managers of Mechanics, Installers, an	16	16	-	4	4	\$32.22
0	49-2011	Computer, Automated Teller, and Office Machine Repairers	169	164	(5)	43	38	\$18.18
0	49-2021	Radio Mechanics	-	-	-	-	-	\$16.04
0	49-2022	Telecommunications Equipment Installers and Repairers, Ex	23	19	(4)	6	2	\$24.45
1	49-2091	Avionics Technicians	-	-	-	-	-	\$29.19
0	49-2092	Electric Motor, Power Tool, and Related Repairers	-	-	-	-	-	\$16.98
0	49-2093	Electrical and Electronics Installers and Repairers, Transpor	5	4	(1)	1	-	\$22.72
0	49-2094	Electrical and Electronics Repairers, Commercial and Indust	7	7	-	1	1	\$30.79
0	49-2095	Electrical and Electronics Repairers, Powerhouse, Substation	22	23	1	4	5	\$32.31
0	49-2096	Electronic Equipment Installers and Repairers, Motor Vehic	5	4	(1)	1	-	\$14.03
0	49-2097	Electronic Home Entertainment Equipment Installers and R	6	4	(2)	2	-	\$20.97
0	49-2098	Security and Fire Alarm Systems Installers	10	9	(1)	2	1	\$21.91
1	49-3011	Aircraft Mechanics and Service Technicians	1	1	-	-	-	\$27.49
0	49-3021	Automotive Body and Related Repairers	-	-	-	-	-	\$18.14
0	49-3022	Automotive Glass Installers and Repairers	-	-	-	-	-	\$17.42
1	49-3023	Automotive Service Technicians and Mechanics	14	16	2	3	5	\$17.64
0	49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	-	-	-	-	-	\$21.73
0	49-3041	Farm Equipment Mechanics	-	-	-	-	-	\$15.23
0	49-3042	Mobile Heavy Equipment Mechanics, Except Engines	5	8	3	1	4	\$27.21
0	49-3043	Rail Car Repairers	-	-	-	-	-	\$26.91
0	49-3051	Motorboat Mechanics	-	-	-	-	-	\$12.29
0	49-3052	Motorcycle Mechanics	-	-	-	-	-	\$13.32
0	49-3053	Outdoor Power Equipment and Other Small Engine Mechni	-	-	-	-	-	\$13.81
0	49-3091	Bicycle Repairers	-	-	-	-	-	\$12.17

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	49-3092	Recreational Vehicle Service Technicians	-	-	-	-	-	\$18.89
0	49-3093	Tire Repairers and Changers	1	1	-	-	-	\$14.04
0	49-9011	Mechanical Door Repairers	-	-	-	-	-	\$15.66
0	49-9012	Control and Valve Installers and Repairers, Except Mechani	3	3	-	-	-	\$28.26
0	49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and	-	-	-	-	-	\$22.71
0	49-9031	Home Appliance Repairers	1	1	-	-	-	\$13.92
0	49-9041	Industrial Machinery Mechanics	18	23	5	3	8	\$23.58
0	49-9042	Maintenance and Repair Workers, General	56	62	6	9	15	\$19.21
0	49-9043	Maintenance Workers, Machinery	13	13	-	2	2	\$18.66
0	49-9044	Millwrights	3	3	-	1	1	\$20.67
0	49-9051	Electrical Power-Line Installers and Repairers	37	37	-	15	15	\$33.84
0	49-9052	Telecommunications Line Installers and Repairers	20	20	-	4	4	\$21.58
0	49-9061	Camera and Photographic Equipment Repairers	-	-	-	-	-	\$13.78
0	49-9062	Medical Equipment Repairers	6	5	(1)	2	1	\$24.36
0	49-9063	Musical Instrument Repairers and Tuners	-	-	-	-	-	\$13.84
0	49-9064	Watch Repairers	-	-	-	-	-	\$12.56
0	49-9069	Precision Instrument and Equipment Repairers, All Other	4	5	1	2	3	\$24.09
0	49-9091	Coin, Vending, and Amusement Machine Servicers and Repa	11	11	-	4	4	\$14.55
0	49-9092	Commercial Divers	8	10	2	2	4	\$19.99
0	49-9094	Locksmiths and Safe Repairers	2	2	-	-	-	\$17.14
0	49-9095	Manufactured Building and Mobile Home Installers	5	5	-	1	1	\$18.01
0	49-9096	Riggers	3	1	(2)	2	-	\$22.28
0	49-9098	Helpers--Installation, Maintenance, and Repair Workers	15	16	1	7	8	\$15.57
0	49-9099	Installation, Maintenance, and Repair Workers, All Other	19	19	-	3	3	\$20.96
	<b>51-0000</b>	<b>Production</b>	<b>625</b>	<b>827</b>	<b>202</b>	<b>142</b>	<b>344</b>	<b>\$15.95</b>
0	51-1011	First-Line Supervisors/Managers of Production and Operatin	40	46	6	5	11	\$25.69
0	51-2022	Electrical and Electronic Equipment Assemblers	34	38	4	8	12	\$20.37
1	51-2023	Electromechanical Equipment Assemblers	47	125	78	7	85	\$19.40
0	51-2041	Structural Metal Fabricators and Fitters	7	8	1	2	3	\$19.94
0	51-2091	Fiberglass Laminators and Fabricators	9	43	34	2	36	\$18.48
0	51-2092	Team Assemblers	12	13	1	3	4	\$13.77
0	51-2099	Assemblers and Fabricators, All Other	4	5	1	1	2	\$13.95
0	51-3011	Bakers	11	10	(1)	3	2	\$14.28
0	51-3021	Butchers and Meat Cutters	-	-	-	-	-	\$18.60
0	51-3022	Meat, Poultry, and Fish Cutters and Trimmers	29	43	14	9	23	\$13.21
0	51-3023	Slaughterers and Meat Packers	7	6	(1)	2	1	\$14.12
1	51-3092	Food Batchmakers	1	1	-	-	-	\$10.65
0	51-3093	Food Cooking Machine Operators and Tenders	2	2	-	1	1	\$9.23
0	51-4011	Computer-Controlled Machine Tool Operators, Metal and F	17	17	-	3	3	\$20.71
0	51-4021	Extruding and Drawing Machine Setters, Operators, and Ten	1	-	(1)	1	-	\$16.00
0	51-4022	Forging Machine Setters, Operators, and Tenders, Metal anc	1	1	-	-	-	\$20.53
0	51-4023	Rolling Machine Setters, Operators, and Tenders, Metal and	2	2	-	-	-	\$18.23
0	51-4031	Cutting, Punching, and Press Machine Setters, Operators, an	7	6	(1)	1	-	\$17.94
0	51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Set	2	2	-	-	-	\$12.63
0	51-4034	Lathe and Turning Machine Tool Setters, Operators, and Tr	2	2	-	-	-	\$19.26
0	51-4041	Machinists	27	26	(1)	6	5	\$24.73
0	51-4071	Foundry Mold and Coremakers	1	1	-	-	-	\$17.74
0	51-4072	Molding, Coremaking, and Casting Machine Setters, Operate	17	17	-	4	4	\$23.82
0	51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Me	1	1	-	-	-	\$21.72
0	51-4111	Tool and Die Makers	3	3	-	-	-	\$23.95
0	51-4121	Welders, Cutters, Solderers, and Brazers	18	19	1	6	7	\$22.91
0	51-4122	Welding, Soldering, and Brazing Machine Setters, Operators.	7	7	-	2	2	\$20.35
0	51-4199	Metal Workers and Plastic Workers, All Other	-	-	-	-	-	\$19.47
0	51-5011	Bindery Workers	-	-	-	-	-	\$15.43
0	51-5021	Job Printers	-	-	-	-	-	\$15.89

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	51-5022	Prepress Technicians and Workers	2	2	-	-	-	\$20.72
0	51-5023	Printing Machine Operators	2	2	-	-	-	\$17.92
0	51-6011	Laundry and Dry-Cleaning Workers	7	9	2	1	3	\$13.28
0	51-6021	Pressers, Textile, Garment, and Related Materials	-	-	-	-	-	\$8.76
0	51-6031	Sewing Machine Operators	-	-	-	-	-	\$10.16
0	51-6041	Shoe and Leather Workers and Repairers	-	-	-	-	-	\$10.80
0	51-6051	Sewers, Hand	-	-	-	-	-	\$7.34
0	51-6052	Tailors, Dressmakers, and Custom Sewers	-	-	-	-	-	\$9.74
0	51-6062	Textile Cutting Machine Setters, Operators, and Tenders	-	-	-	-	-	\$11.94
0	51-6093	Upholsterers	-	-	-	-	-	\$9.64
0	51-6099	Textile, Apparel, and Furnishings Workers, All Other	-	-	-	-	-	\$23.72
0	51-7011	Cabinetmakers and Bench Carpenters	4	4	-	1	1	\$14.83
0	51-7021	Furniture Finishers	-	-	-	-	-	\$11.14
0	51-7031	Model Makers, Wood	-	-	-	-	-	\$12.87
0	51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	-	-	-	-	-	\$13.12
0	51-7042	Woodworking Machine Setters, Operators, and Tenders, Ex	-	-	-	-	-	\$11.61
0	51-7099	Woodworkers, All Other	2	3	1	-	1	\$12.72
0	51-8013	Power Plant Operators	58	71	13	21	34	\$33.16
0	51-8021	Stationary Engineers and Boiler Operators	8	7	(1)	1	-	\$30.68
0	51-8031	Water and Liquid Waste Treatment Plant and System Oper	18	37	19	4	23	\$20.68
0	51-8093	Petroleum Pump System Operators, Refinery Operators, an	7	7	-	2	2	\$29.48
1	51-9011	Chemical Equipment Operators and Tenders	2	3	1	1	2	\$24.24
0	51-9012	Separating, Filtering, Clarifying, Precipitating, and Skill Mac	2	5	3	0	3	\$12.91
0	51-9021	Crushing, Grinding, and Polishing Machine Setters, Operator	1	-	(1)	1	-	\$27.74
0	51-9022	Grinding and Polishing Workers, Hand	2	2	-	-	-	\$14.64
0	51-9023	Mixing and Blending Machine Setters, Operators, and Tende	4	5	1	1	2	\$15.47
0	51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	-	-	-	-	-	\$13.90
0	51-9041	Extruding, Forming, Pressing, and Compacting Machine Setu	4	4	-	1	1	\$15.93
0	51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	80	83	3	13	16	\$18.13
0	51-9071	Jewelers and Precious Stone and Metal Workers	-	-	-	-	-	\$13.84
0	51-9081	Dental Laboratory Technicians	41	57	16	8	24	\$18.74
0	51-9082	Medical Appliance Technicians	5	5	-	1	1	\$23.80
0	51-9083	Ophthalmic Laboratory Technicians	23	28	5	4	9	\$13.53
0	51-9111	Packaging and Filling Machine Operators and Tenders	4	6	2	1	3	\$11.66
0	51-9121	Coating, Painting, and Spraying Machine Setters, Operators.	1	1	-	1	1	\$11.80
0	51-9122	Painters, Transportation Equipment	2	2	-	1	1	\$17.72
0	51-9123	Painting, Coating, and Decorating Workers	-	-	-	-	-	\$10.82
0	51-9131	Photographic Process Workers	1	1	-	1	1	\$17.43
0	51-9132	Photographic Processing Machine Operators	7	10	3	4	7	\$12.40
0	51-9192	Cleaning, Washing, and Metal Pickling Equipment Operator	-	-	-	-	-	\$13.79
0	51-9194	Etchers and Engravers	-	-	-	-	-	\$18.06
0	51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	1	1	-	1	1	\$13.62
0	51-9196	Paper Goods Machine Setters, Operators, and Tenders	-	-	-	-	-	\$20.59
0	51-9197	Tire Builders	-	-	-	-	-	\$17.50
0	51-9198	Helpers--Production Workers	5	4	(1)	1	-	\$11.95
0	51-9199	Production Workers, All Other	12	13	1	3	4	\$14.75
	<b>53-0000</b>	<b>Transportation and Material Moving</b>	<b>193</b>	<b>198</b>	<b>5</b>	<b>52</b>	<b>57</b>	<b>\$16.13</b>
0	53-1011	Aircraft Cargo Handling Supervisors	-	-	-	-	-	\$17.77
0	53-1021	First-Line Supervisors/Managers of Helpers, Laborers, and M	4	4	-	1	1	\$20.84
0	53-1031	First-Line Supervisors/Managers of Transportation and Mat	7	7	-	1	1	\$25.12
0	53-2011	Airline Pilots, Copilots, and Flight Engineers	-	-	-	-	-	\$44.32
0	53-2012	Commercial Pilots	1	1	-	-	-	\$48.29
0	53-2021	Air Traffic Controllers	-	-	-	-	-	\$41.43
0	53-3021	Bus Drivers, Transit and Intercity	12	12	-	2	2	\$19.14
0	53-3022	Bus Drivers, School	-	-	-	-	-	\$16.12

## Appendix B: Detailed Data

STEM Status	SOC Code	Description	Tech Sector					2011 Avg Hourly Wage
			Jobs 2011	Jobs 2021	Growth 2011-21	Replace. 2011-21	Opening 2011-21	
0	53-3031	Driver/Sales Workers	-	-	-	-	-	\$13.35
0	53-3032	Truck Drivers, Heavy and Tractor-Trailer	11	10	(1)	2	1	\$19.22
0	53-3033	Truck Drivers, Light or Delivery Services	16	18	2	3	5	\$14.70
0	53-3041	Taxi Drivers and Chauffeurs	12	13	1	2	3	\$11.84
0	53-3099	Motor Vehicle Operators, All Other	1	1	-	-	-	\$21.04
0	53-4011	Locomotive Engineers	-	-	-	-	-	\$27.50
0	53-4021	Railroad Brake, Signal, and Switch Operators	-	-	-	-	-	\$18.96
0	53-4031	Railroad Conductors and Yardmasters	1	1	-	-	-	\$24.56
0	53-5011	Sailors and Marine Oilers	-	-	-	-	-	\$14.25
0	53-5021	Captains, Mates, and Pilots of Water Vessels	-	-	-	-	-	\$28.23
0	53-5022	Motorboat Operators	1	1	-	-	-	\$18.17
0	53-5031	Ship Engineers	-	-	-	-	-	\$27.13
0	53-6021	Parking Lot Attendants	-	-	-	-	-	\$9.81
0	53-6031	Service Station Attendants	2	2	-	1	1	\$12.60
0	53-6041	Traffic Technicians	6	6	-	2	2	\$24.62
1	53-6051	Transportation Inspectors	2	2	-	-	-	\$28.92
0	53-6099	Transportation Workers, All Other	-	-	-	-	-	\$14.53
0	53-7011	Conveyor Operators and Tenders	5	5	-	2	2	\$14.68
0	53-7021	Crane and Tower Operators	-	-	-	-	-	\$33.79
0	53-7032	Excavating and Loading Machine and Dragline Operators	-	-	-	-	-	\$19.76
0	53-7051	Industrial Truck and Tractor Operators	13	12	(1)	4	3	\$18.44
0	53-7061	Cleaners of Vehicles and Equipment	8	5	(3)	3	-	\$11.06
0	53-7062	Laborers and Freight, Stock, and Material Movers, Hand	65	73	8	24	32	\$14.83
0	53-7063	Machine Feeders and Offbearers	2	1	(1)	1	-	\$10.61
0	53-7064	Packers and Packagers, Hand	19	19	-	4	4	\$10.69
0	53-7072	Pump Operators, Except Wellhead Pumps	-	-	-	-	-	\$20.94
0	53-7073	Wellhead Pumps	-	-	-	-	-	\$20.00
0	53-7081	Refuse and Recyclable Material Collectors	-	-	-	-	-	\$16.83
0	53-7199	Material Moving Workers, All Other	5	5	-	1	1	\$21.23
	<b>55-0000</b>	<b>Military</b>	-	-	-	-	-	<b>\$15.82</b>
0	55-9999	Military Occupations	-	-	-	-	-	\$15.82
	<b>99-0000</b>	<b>Unclassified</b>	<b>217</b>	<b>352</b>	<b>135</b>	<b>-</b>	<b>135</b>	<b>\$13.59</b>
0	99-9999	Unclassified Occupation	217	352	135	-	135	\$13.59