

Workforce Trends In and Occupational Forecasts For Northern Virginia, 2010-2020

Prepared for

The Northern Virginia Community College

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Summary of Research Findings

The Northern Virginia economy is projected to grow 39.1 percent over the current decade. To support that growth, its employment base is projected to increase by 303,273 net new full-time jobs for an increase of 20.1 percent. This difference in the economy's growth rate and the percentage increase in jobs in Northern Virginia is indicative of changes in the composition of the workforce, its distribution across sectors, its educational and training requirements, and the structural changes that underlie the region's emerging economy. In short, for a twenty percent increase in employment to generate a 39 percent increase in output will require a significant shift of employment from lower productivity, lower value-added jobs to higher productivity, higher-value added jobs.

The questions to be addressed here are: What types of new jobs will drive Northern Virginia's economic growth over the next ten years and what education and skills will these new jobs require? While these questions appear rather simple, the answers are a little more complicated and raise an even more important question: Where will Northern Virginia get these new workers? This is by far the more difficult question to answer and will become the principal threat to Northern Virginia's economic vitality and sustainability going forward.

Northern Virginia's Demand for Workers, 2010-2020

First, it is necessary to understand the nature of the future demand for workers in Northern Virginia. There are two sources of demand for new workers: (1) business growth that generates net new job demand and (2) job demand that is generated by retirements and the normal turn-over process in the labor force. This second source of labor demand is often overlooked because it does not represent growth but just the maintenance of the current level of employment. However, the replacement of workers departing from the workforce, whether due to normal turnover or retirement, facilitates a churn in the employment base.

This churn itself can result in substantial structural changes in the economy as the employment requirements of business shift in response to workers' departures (retirement or turnover) to better utilize technology, shift responsibilities among existing workers, or move positions to business lines and functions that more efficiently utilize the current workforce. These changes can occur when the employment base is declining, as it did in 2009, to redeploy a smaller workforce to achieve greater efficiencies at reduced labor costs. And, in a growing economy, the combination of replacement and net new job growth can quickly alter the sectoral

structure of the economy resulting in a changing pattern of labor force requirements. As the Baby Boomers retire over the next two decades, this pattern of structural change (from within the existing workforce) will become a greater source of workforce demand than the economy’s expansion as measured by the generation of net new jobs.

It is important to separate these two sources of job demand as they have different educational and skills characteristics and different sectoral patterns; that, is, some sectors turn over employees faster than others while others will generate net new job growth faster than they generate demand for replacement workers. Still, the job demand represented by both replacement positions and net new job growth will exceed the ability of the growing residential population in Northern Virginia to supply the numbers of new workers needed over this decade, and the next decade as well, to support Northern Virginia’s capacity for economic growth. Consequently, the ability to backfill replacement positions or expand the workforce to fill net new job growth constitute two parts of a single problem.

What Types of Jobs Will Northern Virginia’s Economy Generate?

The magnitude of the workforce challenge that Northern Virginia will have to confront in order to achieve its projected economic growth potential over the current decade is summarized in Table 1.

Table 1
Job Demand in Northern Virginia, 2010-2020
(in thousands)

Type of Job	2010	2020	Change	Percent
Total Jobs	1,509.1	1,812.4	303.3	20.1
Replacement			346.4	23.0
Total Openings			649.7	43.1

As a result of the projected growth in the Northern Virginia economy over the 2010-2020 period there will be a demand for 303,273 net new workers to fill jobs that will be created during the decade, jobs that did not exist in Northern Virginia before 2010. Additionally, of the jobs existing in 2010, 346,406 or 23.0 percent will need to be back filled with replacement workers over the next decade as a result of retirements or normal turnover.

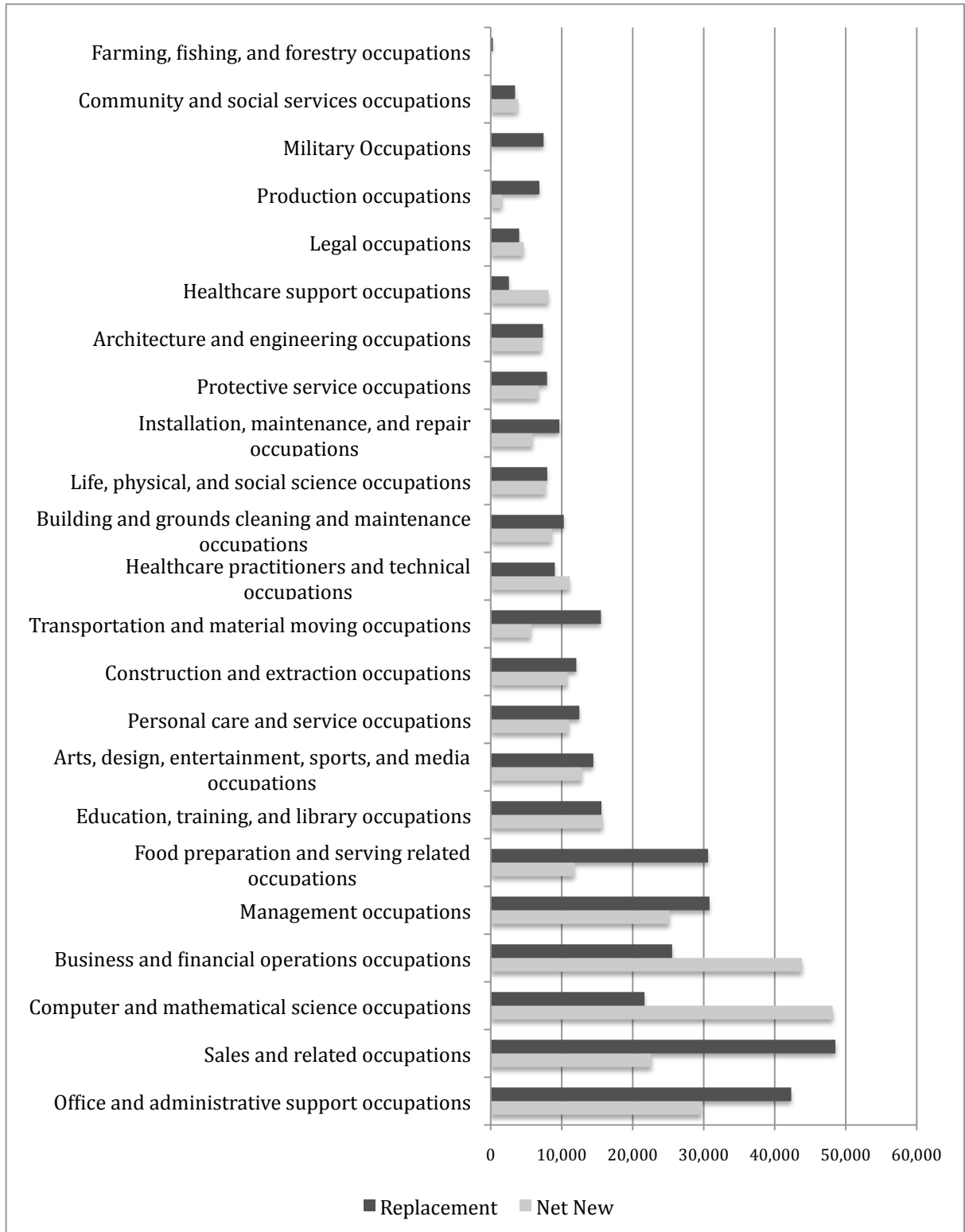
In total, there will be a need for 649,679 new workers to fill these positions, workers not now working in Northern Virginia. These new workers could be

workers already in the Washington area and working outside of Northern Virginia, new entrants to the workforce—graduates from local high schools, colleges and universities, workers moving to the Washington area to fill jobs in Northern Virginia (these will need a place to live, requiring expansion of the current housing stock to accommodate these new households), residents who currently are unemployed or not participating in the labor market who re-join the local workforce, workers who take on a second job who currently are only holding one job, workers joining the civilian workforce from military duty, and workers who retire from the workforce and subsequently are re-employed—the “encore” worker.

These sources of future workers may provide the “number” of new workers needed to fill these projected jobs but may not fulfill the “education and skills requirements” associated with these replacement and net new jobs. These requirements further define the magnitude of the workforce development challenge facing Northern Virginia’s future economy.

The magnitudes of the replacement and net new jobs as defined by the occupations in which these positions will be located are summarized in the appendices. Appendix Table 1 presents the top 50 occupations ranked by the number of “replacement jobs.” Appendix Table 2 presents the top 50 occupations ranked by the number of “net new jobs.” These two rankings are combined in Appendix Table 3 to present the total positions—net new and replacement—that will need to be filled between 2010 and 2020. These patterns are shown in graphic form on the following page.

Figure 1.
 Job Openings by Net New versus Replacement Jobs in the NVCC Service Area,
 2010-2020



Source: EMSI and GMU Center for Regional Analysis

Northern Virginia's High Growth Sectors

The five sectors (not occupations) accounting for the greatest source of demand for net new jobs are presented in Table 2. These five sectors account for 72.3 percent of the net new jobs projected for Northern Virginia this decade. These categories illustrate the breadth of workforce demand as well as the orders of magnitude differentiating the economy's major growth sectors.

The professional, scientific and technical services sector is projected to generate 124,157 net new jobs (in addition to the replacement jobs that will need to be backfilled) accounting for 41 percent of all net new jobs in Northern Virginia between 2010 and 2020. The dominance of this one sector and its importance as a source of economic growth in Northern Virginia over this decade are seen in its comparative performance.

The second fastest growing sector in Northern Virginia over the next ten years is health care and social assistance. Even though it is projected to grow strongly, its projected increase is only one-fourth the magnitude of the gain projected for the professional, scientific and technical services sector. In fact, the professional, scientific and technical services sector is projected to add more net new jobs during the current decade than the combined total for next four largest sources of net new job growth. As combined these five sectors will grow faster than the average for all jobs; they are projected to increase their share of total jobs in Northern Virginia from 54.8 percent in 2010 to 57.8 percent by 2020.

Table 2

Five Major Sectoral Sources of Net New Job Growth
In Northern Virginia, 2010-2020

Sector	2010 Jobs	2010-2020 Job Change	Percent Change	% All New Jobs
Prof., Scientific, Tech	316,175	124,157	39.2	40.9
Health Care	107,377	32,113	30.0	10.6
Government	243,555	29,454	12.1	9.7
Admin Support	94,639	18,421	19.5	6.4
Real Estate Services	66,022	15,239	23.1	5.0
Total 5 Sector	827,768	219,384	26.5	72.3
% of All Jobs	54.8			
Total All Jobs	1,509,110	1,812,383	20.1	

While one way to rank the economy's sectors is by the numbers of net new jobs they are projected to generate, another way is to identify the sectors that have a higher

proportion of jobs in Northern Virginia relative to the nation’s sectoral job mix. These are the sectors in which Northern Virginia can be said to possess a competitive advantage over its peer regions.

These advantageous sectors were identified in research conducted by the Center for Regional Analysis in 2009 to determine the sectoral specializations in Northern Virginia in comparison to the District of Columbia and Suburban Maryland. Eight sectors were identified. These eight sectors are projected to account for net new job growth totaling 135,687 in Northern Virginia, reflecting a 10-year gain of 34.9 percent and 44.7 percent of all net new jobs over this period. Five of these eight sectors are included within the professional, scientific and technical services sector identified above as the sector projected to add the greatest number of net new jobs this decade in Northern Virginia. These eight sectors and their projected job growth are shown in Table 3.

Table 3.

Jobs by Key Sectors, Sorted by Net New Jobs

NAICS Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	2010 NVCC LQ
5416	Management, Scientific, and Technical Consulting Services	73,310	123,873	50,563	69%	4.38
5415	Computer Systems Design and Related Services	120,813	170,219	49,406	41%	7.21
9110	Federal government, civilian, except postal service	97,557	112,478	14,921	15%	4.80
5413	Architectural, Engineering, and Related Services	34,017	41,566	7,549	22%	2.44
5419	Other Professional, Scientific, and Technical Services	26,510	32,561	6,051	23%	1.64
5411	Legal Services	13,652	16,679	3,027	22%	1.06
5417	Scientific Research and Development Services	19,264	21,975	2,711	14%	3.28
8133	Social Advocacy Organizations	3,325	4,785	1,460	44%	1.82
	Total	388,448	524,135	135,687	35%	

Source: EMSI and GMU Center for Regional Analysis

Educational and Skills Training Requirements of the Net New and Replacement Jobs

Different types of jobs require different levels of education and skills training. Across the economy, the net new and replacement jobs also have different education and skills requirements. A third aspect that is not reflected in these data is the expectation that jobs vacated by retirees are likely to require higher levels of training and education from new hires than they did previously. As a large percentage of replacement jobs will be filled internally within a business or government agency, up-skilling and continuing education of workers already in the workforce will become even more important going forward than it is today, especially for workers under the age of 45, most of whom will still be in the labor force twenty years from now.

Tables 4, 5 and 6 present the educational and skills requirements associated with the projected net new job growth and replacement jobs. Table 4 presents the educational and skills requirements for the top twenty occupations that span the sectors that represent Northern Virginia's core industries—its high growth, high value-added sectors that will be its primary source of growth over the coming decade.

Table 5 shows the full range of education and skills requirements for Northern Virginia's projected net new jobs and replacement positions. Almost 50 percent of all net new jobs will require four or more years of college while only 31 percent of replacement jobs will require this level of education. The demand for college-educated workers also differentiates Northern Virginia from the US economy. At the national level, only 34% of net new jobs will require four or more years of college.

Table 4.

Job Growth in the Top 20 Occupations (by Net New Jobs) across the Core Industries

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Education Level
13-1111	Management analysts	32,832	49,003	16,171	49%	Degree plus work experience
15-1051	Computer systems analysts	18,473	25,175	6,702	36%	Bachelor's degree
15-1031	Computer software engineers, applications	17,742	26,788	9,046	51%	Bachelor's degree
15-1032	Computer software engineers, systems software	16,680	25,144	8,464	51%	Bachelor's degree
13-1199	Business operation specialists, all other	14,598	18,133	3,535	24%	Bachelor's degree
23-1011	Lawyers	12,565	14,920	2,355	19%	First professional degree
27-4021	Photographers	11,986	14,411	2,425	20%	Long-term on-the-job training
11-9199	Managers, all other	10,738	13,314	2,576	24%	Work experience in a related field
11-1021	General and operations managers	10,285	12,918	2,633	26%	Degree plus work experience
15-1081	Network systems and data communications analysts	8,188	13,853	5,665	69%	Bachelor's degree
15-1071	Network and computer systems administrators	7,812	12,541	4,729	61%	Bachelor's degree
15-1021	Computer programmers	7,656	8,375	719	9%	Bachelor's degree
43-9061	Office clerks, general	7,455	10,303	2,848	38%	Short-term on-the-job training
15-1041	Computer support specialists	7,322	10,764	3,442	47%	Associate's degree
15-1099	Computer specialists, all other	6,534	7,841	1,307	20%	Associate's degree
11-3021	Computer and information systems managers	6,458	8,868	2,410	37%	Degree plus work experience
43-6011	Executive secretaries and administrative assistants	5,691	8,276	2,585	45%	Moderate-term on-the-job training
13-2011	Accountants and auditors	5,365	7,824	2,459	46%	Bachelor's degree
19-3021	Market research analysts	4,237	6,443	2,206	52%	Bachelor's degree

Source: EMSI and GMU Center for Regional Analysis

Table 5.

Education Level, All Occupations - Total Openings and Percent of Total Net New and Replacements Jobs 2010-2020 for the NVCC Service Area

Education Level	All Job Openings	Net New Jobs	Replacement Jobs
Doctoral degree	7,207	3,905	3,302
First professional degree	10,257	5,272	4,985
Master's degree	14,780	7,307	7,473
Degree plus work experience	60,615	32,399	28,216
Bachelor's degree	163,828	99,654	64,174
Associate's degree	23,559	12,534	11,025
Postsecondary vocational award	33,319	18,396	14,923
Work experience in a related field	47,696	21,427	26,269
Long-term on-the-job training	37,235	15,026	22,209
Moderate-term on-the-job training	72,369	34,629	37,740
Short-term on-the-job training	171,209	52,599	118,610
N/A	7,556	114	7,442
Total	649,630	303,262	346,368

Source: EMSI and GMU Center for Regional Analysis

Education Level	All Job Openings	Net New Jobs	Replacement Jobs
Doctoral degree	1%	1%	1%
First professional degree	2%	2%	1%
Master's degree	2%	2%	2%
Degree plus work experience	9%	11%	8%
Bachelor's degree	25%	33%	19%
Associate's degree	4%	4%	3%
Postsecondary vocational award	5%	6%	4%
Work experience in a related field	7%	7%	8%
Long-term on-the-job training	6%	5%	6%
Moderate-term on-the-job training	11%	11%	11%
Short-term on-the-job training	26%	17%	34%
N/A	1%	0%	2%
Total	100%	100%	100%

Source: EMSI and GMU Center for Regional Analysis

Key Take Aways

- The Northern Virginia economy has the potential to generate significant levels of net new job growth over the 2010-2020 period, but the demand for workers will be more than double the net gain in jobs as the number of retirees and normal job turnover will add to the total number of job positions to be filled. The forecast calls for 303,273 net new jobs (47% of total openings) and 346,406 replacement positions (53% of the total openings).
- While there will be demand for both new and replacement workers in all sectors and occupations, Northern Virginia's most important sources of employment will also continue to be its dominant growth sectors over the next 10 years. Professional, scientific and technical services will account for 41 percent of net new job growth with the next four largest generators of net new jobs together accounting for 31 percent of net new job additions.
- Forty-nine percent (49%) of net new jobs will require at least a four-year college degree compared to 34% for net new jobs nationwide. Only 31% of all replacement jobs will require at least a four-year college degree.
- "Middle tier" jobs, occupations requiring more than a high school diploma but less than a graduate degree, will account for 41% of all job positions in Northern Virginia by 2020 and 54% of net new jobs.
- Approximately 57,000 job openings from 2010 to 2020 – 9 percent of the total – are forecast to require either a post-secondary vocational award or an associate's degree.

*Northern Virginia is defined in this research as the service area of Northern Virginia Community College: Arlington, Fairfax, Loudoun, and Prince William Counties and Independent Cities (Fairfax, Falls Church, Manassas City and Manassas Park) and the City of Alexandria.

APPENDIX

Table A1.

**JOBS BY OCCUPATION. Top 50 Occupations Ranked by Replacement Jobs,
2010-2020**
5-digit Standard Occupational Classification (SOC) codes

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacement	Education Level
41-2011	Cashiers, except gaming	26,387	27,921	1,534	6%	13,974	12,440	Short-term on-the-job training
41-2031	Retail salespersons	38,492	41,696	3,204	8%	14,827	11,623	Short-term on-the-job training
35-3031	Waiters and waitresses	17,685	19,480	1,795	10%	11,639	9,844	Short-term on-the-job training
11-1021	General and operations managers	30,300	33,512	3,212	11%	11,992	8,780	Degree plus work experience
55-9999	Military Occupations	31,836	31,950	114	0%	7,556	7,442	N/A
13-1111	Management analysts	37,377	54,111	16,734	45%	23,150	6,416	Degree plus work experience
11-9199	Managers, all other	23,737	28,433	4,696	20%	10,852	6,156	Work experience in a related field
43-4051	Customer service representatives	18,421	23,148	4,727	26%	10,525	5,798	Moderate-term on-the-job training
37-2011	Janitors and cleaners, except maids and housekeeping cleaners	24,123	26,523	2,400	10%	7,678	5,278	Short-term on-the-job training
15-1051	Computer systems analysts	23,809	31,318	7,509	32%	12,640	5,131	Bachelor's degree
35-3021	Combined food preparation and serving workers, including fast food	22,857	27,313	4,456	19%	9,305	4,849	Short-term on-the-job training
13-1199	Business operation specialists, all other	21,449	25,856	4,407	21%	9,205	4,798	Bachelor's degree
43-9061	Office clerks, general	33,029	39,661	6,632	20%	11,132	4,500	Short-term on-the-job training
39-9011	Child care workers	13,480	15,281	1,801	13%	5,825	4,024	Short-term on-the-job training
41-9022	Real estate sales agents	23,629	30,105	6,476	27%	10,411	3,935	Postsecondary vocational award
41-1011	First-line supervisors/managers of retail sales workers	15,487	15,854	367	2%	4,239	3,872	Work experience in a related field
53-7062	Laborers and freight, stock, and material movers, hand	10,545	10,913	368	3%	3,884	3,516	Short-term on-the-job training
13-2011	Accountants and auditors	20,215	25,871	5,656	28%	9,074	3,418	Bachelor's degree

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacement	Education Level
43-4171	Receptionists and information clerks	11,882	14,235	2,353	20%	5,558	3,205	Short-term on-the-job training
33-9032	Security guards	15,144	18,843	3,699	24%	6,815	3,116	Short-term on-the-job training
15-1041	Computer support specialists	10,993	14,693	3,700	34%	6,744	3,044	Associate's degree
35-3022	Counter attendants, cafeteria, food concession, and coffee shop	3,971	4,568	597	15%	3,515	2,918	Short-term on-the-job training
23-1011	Lawyers	15,190	18,087	2,897	19%	5,781	2,884	First professional degree
43-1011	First-line supervisors/managers of office and administrative support workers	12,256	14,540	2,284	19%	5,049	2,765	Work experience in a related field
43-5081	Stock clerks and order fillers	11,642	13,006	1,364	12%	4,052	2,688	Short-term on-the-job training
25-2021	Elementary school teachers, except special education	11,718	14,205	2,487	21%	5,151	2,664	Bachelor's degree
27-4021	Photographers	12,918	15,498	2,580	20%	5,222	2,642	Long-term on-the-job training
37-2012	Maids and housekeeping cleaners	13,312	14,916	1,604	12%	4,020	2,416	Short-term on-the-job training
11-9141	Property, real estate, and community association managers	13,737	17,413	3,676	27%	6,082	2,406	Bachelor's degree
41-3099	Sales representatives, services, all other	9,605	11,895	2,290	24%	4,674	2,384	Moderate-term on-the-job training
43-6011	Executive secretaries and administrative assistants	17,231	21,472	4,241	25%	6,562	2,321	Moderate-term on-the-job training
15-1081	Network systems and data communications analysts	12,347	19,739	7,392	60%	9,612	2,220	Bachelor's degree
41-3031	Securities, commodities, and financial services sales agents	7,229	9,756	2,527	35%	4,743	2,216	Bachelor's degree
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	9,507	10,975	1,468	15%	3,670	2,202	Moderate-term on-the-job training
25-2031	Secondary school teachers, except special and vocational education	7,217	8,238	1,021	14%	3,134	2,113	Bachelor's degree
15-1071	Network and computer systems administrators	12,468	17,977	5,509	44%	7,587	2,078	Bachelor's degree
29-1111	Registered nurses	11,731	14,826	3,095	26%	5,154	2,059	Associate's degree
41-9091	Door-to-door sales workers, news and street vendors, and related workers	5,983	5,110	(873)	(15%)	1,143	2,016	Short-term on-the-job training
35-9021	Dishwashers	4,810	5,593	783	16%	2,779	1,996	Short-term on-the-job training

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacement	Education Level
11-1011	Chief executives	6,994	8,039	1,045	15%	3,012	1,967	Degree plus work experience
35-2014	Cooks, restaurant	7,552	8,408	856	11%	2,822	1,966	Long-term on-the-job training
35-2021	Food preparation workers	5,374	5,890	516	10%	2,454	1,938	Short-term on-the-job training
15-1021	Computer programmers	9,290	9,908	618	7%	2,544	1,926	Bachelor's degree
35-9031	Hosts and hostesses, restaurant, lounge, and coffee shop	2,710	2,981	271	10%	2,170	1,899	Short-term on-the-job training
43-3031	Bookkeeping, accounting, and auditing clerks	15,777	18,637	2,860	18%	4,757	1,897	Moderate-term on-the-job training
15-1031	Computer software engineers, applications	21,390	31,207	9,817	46%	11,616	1,799	Bachelor's degree
25-1099	Postsecondary teachers	10,154	12,498	2,344	23%	4,118	1,774	Doctoral degree
25-9041	Teacher assistants	8,326	9,686	1,360	16%	3,122	1,762	Short-term on-the-job training
15-1032	Computer software engineers, systems software	20,855	30,187	9,332	45%	11,086	1,754	Bachelor's degree
19-3021	Market research analysts	6,434	9,207	2,773	43%	4,503	1,730	Bachelor's degree

Table A2.

JOBS BY OCCUPATION. Top 50 Occupations Ranked by Net New Jobs, 2010-2020
5-digit Standard Occupational Classification (SOC) codes

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
13-1111	Management analysts	37,377	54,111	16,734	45%	23,150	6,416	Degree plus work experience
15-1031	Computer software engineers, applications	21,390	31,207	9,817	46%	11,616	1,799	Bachelor's degree
15-1032	Computer software engineers, systems software	20,855	30,187	9,332	45%	11,086	1,754	Bachelor's degree
15-1051	Computer systems analysts	23,809	31,318	7,509	32%	12,640	5,131	Bachelor's degree
15-1081	Network systems and data communications analysts	12,347	19,739	7,392	60%	9,612	2,220	Bachelor's degree
43-9061	Office clerks, general	33,029	39,661	6,632	20%	11,132	4,500	Short-term on-the-job training
41-9022	Real estate sales agents	23,629	30,105	6,476	27%	10,411	3,935	Postsecondary vocational award
13-2011	Accountants and auditors	20,215	25,871	5,656	28%	9,074	3,418	Bachelor's degree
15-1071	Network and computer systems administrators	12,468	17,977	5,509	44%	7,587	2,078	Bachelor's degree
43-4051	Customer service representatives	18,421	23,148	4,727	26%	10,525	5,798	Moderate-term on-the-job training
11-9199	Managers, all other	23,737	28,433	4,696	20%	10,852	6,156	Work experience in a related field
35-3021	Combined food preparation and serving workers, including fast food	22,857	27,313	4,456	19%	9,305	4,849	Short-term on-the-job training
13-1199	Business operation specialists, all other	21,449	25,856	4,407	21%	9,205	4,798	Bachelor's degree
43-6011	Executive secretaries and administrative assistants	17,231	21,472	4,241	25%	6,562	2,321	Moderate-term on-the-job training
15-1041	Computer support specialists	10,993	14,693	3,700	34%	6,744	3,044	Associate's degree
33-9032	Security guards	15,144	18,843	3,699	24%	6,815	3,116	Short-term on-the-job training
11-9141	Property, real estate, and community association managers	13,737	17,413	3,676	27%	6,082	2,406	Bachelor's degree
13-2052	Personal financial advisors	8,393	11,812	3,419	41%	4,336	917	Bachelor's degree
11-1021	General and operations managers	30,300	33,512	3,212	11%	11,992	8,780	Degree plus work experience

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
41-2031	Retail salespersons	38,492	41,696	3,204	8%	14,827	11,623	Short-term on-the-job training
31-1011	Home health aides	4,397	7,509	3,112	71%	3,552	440	Short-term on-the-job training
29-1111	Registered nurses	11,731	14,826	3,095	26%	5,154	2,059	Associate's degree
23-1011	Lawyers	15,190	18,087	2,897	19%	5,781	2,884	First professional degree
43-3031	Bookkeeping, accounting, and auditing clerks	15,777	18,637	2,860	18%	4,757	1,897	Moderate-term on-the-job training
11-3021	Computer and information systems managers	9,402	12,231	2,829	30%	4,356	1,527	Degree plus work experience
19-3021	Market research analysts	6,434	9,207	2,773	43%	4,503	1,730	Bachelor's degree
27-4021	Photographers	12,918	15,498	2,580	20%	5,222	2,642	Long-term on-the-job training
37-3011	Landscaping and groundskeeping workers	9,429	11,959	2,530	27%	3,665	1,135	Short-term on-the-job training
41-3031	Securities, commodities, and financial services sales agents	7,229	9,756	2,527	35%	4,743	2,216	Bachelor's degree
25-3099	Teachers and instructors, all other	10,421	12,922	2,501	24%	4,104	1,603	Bachelor's degree
27-3031	Public relations specialists	6,725	9,214	2,489	37%	4,082	1,593	Bachelor's degree
25-2021	Elementary school teachers, except special education	11,718	14,205	2,487	21%	5,151	2,664	Bachelor's degree
47-2061	Construction laborers	11,423	13,855	2,432	21%	3,213	781	Moderate-term on-the-job training
37-2011	Janitors and cleaners, except maids and housekeeping cleaners	24,123	26,523	2,400	10%	7,678	5,278	Short-term on-the-job training
43-4171	Receptionists and information clerks	11,882	14,235	2,353	20%	5,558	3,205	Short-term on-the-job training
25-1099	Postsecondary teachers	10,154	12,498	2,344	23%	4,118	1,774	Doctoral degree
41-3099	Sales representatives, services, all other	9,605	11,895	2,290	24%	4,674	2,384	Moderate-term on-the-job training
43-1011	First-line supervisors/managers of office and administrative support workers	12,256	14,540	2,284	19%	5,049	2,765	Work experience in a related field
13-2051	Financial analysts	5,924	8,193	2,269	38%	3,344	1,075	Bachelor's degree
49-9042	Maintenance and repair workers, general	10,721	12,861	2,140	20%	3,791	1,651	Moderate-term on-the-job training

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
47-2111	Electricians	6,884	8,990	2,106	31%	3,784	1,678	Long-term on-the-job training
39-9021	Personal and home care aides	4,192	6,140	1,948	46%	2,472	524	Short-term on-the-job training
41-9021	Real estate brokers	7,104	9,037	1,933	27%	3,118	1,185	Work experience in a related field
11-3031	Financial managers	8,607	10,484	1,877	22%	3,425	1,548	Degree plus work experience
31-1012	Nursing aides, orderlies, and attendants	6,027	7,835	1,808	30%	2,408	600	Postsecondary vocational award
39-9011	Child care workers	13,480	15,281	1,801	13%	5,825	4,024	Short-term on-the-job training
35-3031	Waiters and waitresses	17,685	19,480	1,795	10%	11,639	9,844	Short-term on-the-job training
37-2012	Maids and housekeeping cleaners	13,312	14,916	1,604	12%	4,020	2,416	Short-term on-the-job training
53-3041	Taxi drivers and chauffeurs	7,802	9,388	1,586	20%	3,007	1,421	Short-term on-the-job training
41-2011	Cashiers, except gaming	26,387	27,921	1,534	6%	13,974	12,440	Short-term on-the-job training

Table A3

JOBS BY OCCUPATION. Top 50 Occupations Ranked by Total Openings, 2010-2020
5-digit Standard Occupational Classification (SOC) codes

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
13-1111	Management analysts	37,377	54,111	16,734	45%	23,150	6,416	Degree plus work experience
41-2031	Retail salespersons	38,492	41,696	3,204	8%	14,827	11,623	Short-term on-the-job training
41-2011	Cashiers, except gaming	26,387	27,921	1,534	6%	13,974	12,440	Short-term on-the-job training
15-1051	Computer systems analysts	23,809	31,318	7,509	32%	12,640	5,131	Bachelor's degree
11-1021	General and operations managers	30,300	33,512	3,212	11%	11,992	8,780	Degree plus work experience
35-3031	Waiters and waitresses	17,685	19,480	1,795	10%	11,639	9,844	Short-term on-the-job training
15-1031	Computer software engineers, applications	21,390	31,207	9,817	46%	11,616	1,799	Bachelor's degree
43-9061	Office clerks, general	33,029	39,661	6,632	20%	11,132	4,500	Short-term on-the-job training
15-1032	Computer software engineers, systems software	20,855	30,187	9,332	45%	11,086	1,754	Bachelor's degree
11-9199	Managers, all other	23,737	28,433	4,696	20%	10,852	6,156	Work experience in a related field
43-4051	Customer service representatives	18,421	23,148	4,727	26%	10,525	5,798	Moderate-term on-the-job training
41-9022	Real estate sales agents	23,629	30,105	6,476	27%	10,411	3,935	Postsecondary vocational award
15-1081	Network systems and data communications analysts	12,347	19,739	7,392	60%	9,612	2,220	Bachelor's degree
35-3021	Combined food preparation and serving workers, including fast food	22,857	27,313	4,456	19%	9,305	4,849	Short-term on-the-job training
13-1199	Business operation specialists, all other	21,449	25,856	4,407	21%	9,205	4,798	Bachelor's degree
13-2011	Accountants and auditors	20,215	25,871	5,656	28%	9,074	3,418	Bachelor's degree
37-2011	Janitors and cleaners, except maids and housekeeping cleaners	24,123	26,523	2,400	10%	7,678	5,278	Short-term on-the-job training
15-1071	Network and computer systems administrators	12,468	17,977	5,509	44%	7,587	2,078	Bachelor's degree
55-9999	Military Occupations	31,836	31,950	114	0%	7,556	7,442	N/A

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
33-9032	Security guards	15,144	18,843	3,699	24%	6,815	3,116	Short-term on-the-job training
15-1041	Computer support specialists	10,993	14,693	3,700	34%	6,744	3,044	Associate's degree
43-6011	Executive secretaries and administrative assistants	17,231	21,472	4,241	25%	6,562	2,321	Moderate-term on-the-job training
11-9141	Property, real estate, and community association managers	13,737	17,413	3,676	27%	6,082	2,406	Bachelor's degree
39-9011	Child care workers	13,480	15,281	1,801	13%	5,825	4,024	Short-term on-the-job training
23-1011	Lawyers	15,190	18,087	2,897	19%	5,781	2,884	First professional degree
43-4171	Receptionists and information clerks	11,882	14,235	2,353	20%	5,558	3,205	Short-term on-the-job training
27-4021	Photographers	12,918	15,498	2,580	20%	5,222	2,642	Long-term on-the-job training
29-1111	Registered nurses	11,731	14,826	3,095	26%	5,154	2,059	Associate's degree
25-2021	Elementary school teachers, except special education	11,718	14,205	2,487	21%	5,151	2,664	Bachelor's degree
43-1011	First-line supervisors/managers of office and administrative support workers	12,256	14,540	2,284	19%	5,049	2,765	Work experience in a related field
43-3031	Bookkeeping, accounting, and auditing clerks	15,777	18,637	2,860	18%	4,757	1,897	Moderate-term on-the-job training
41-3031	Securities, commodities, and financial services sales agents	7,229	9,756	2,527	35%	4,743	2,216	Bachelor's degree
41-3099	Sales representatives, services, all other	9,605	11,895	2,290	24%	4,674	2,384	Moderate-term on-the-job training
19-3021	Market research analysts	6,434	9,207	2,773	43%	4,503	1,730	Bachelor's degree
11-3021	Computer and information systems managers	9,402	12,231	2,829	30%	4,356	1,527	Degree plus work experience
13-2052	Personal financial advisors	8,393	11,812	3,419	41%	4,336	917	Bachelor's degree
41-1011	First-line supervisors/managers of retail sales workers	15,487	15,854	367	2%	4,239	3,872	Work experience in a related field
25-1099	Postsecondary teachers	10,154	12,498	2,344	23%	4,118	1,774	Doctoral degree
25-3099	Teachers and instructors, all other	10,421	12,922	2,501	24%	4,104	1,603	Bachelor's degree
27-3031	Public relations specialists	6,725	9,214	2,489	37%	4,082	1,593	Bachelor's degree

SOC Code	Description	2010 Jobs	2020 Jobs	Net New Jobs	% Change	Openings	Replacements	Education Level
43-5081	Stock clerks and order fillers	11,642	13,006	1,364	12%	4,052	2,688	Short-term on-the-job training
37-2012	Maids and housekeeping cleaners	13,312	14,916	1,604	12%	4,020	2,416	Short-term on-the-job training
53-7062	Laborers and freight, stock, and material movers, hand	10,545	10,913	368	3%	3,884	3,516	Short-term on-the-job training
49-9042	Maintenance and repair workers, general	10,721	12,861	2,140	20%	3,791	1,651	Moderate-term on-the-job training
47-2111	Electricians	6,884	8,990	2,106	31%	3,784	1,678	Long-term on-the-job training
41-4012	Sales representatives, wholesale and manufacturing, except technical and scientific products	9,507	10,975	1,468	15%	3,670	2,202	Moderate-term on-the-job training
37-3011	Landscaping and groundskeeping workers	9,429	11,959	2,530	27%	3,665	1,135	Short-term on-the-job training
31-1011	Home health aides	4,397	7,509	3,112	71%	3,552	440	Short-term on-the-job training
35-3022	Counter attendants, cafeteria, food concession, and coffee shop	3,971	4,568	597	15%	3,515	2,918	Short-term on-the-job training
11-3031	Financial managers	8,607	10,484	1,877	22%	3,425	1,548	Degree plus work experience

Source: EMSI and GMU Center for Regional Analysis