

Virginia Labor Market Demand Analysis

for George Mason University



May 15, 2020

Report produced by
The University of Virginia
Weldon Cooper Center
for Public Service

The Virginia Labor Market Demand Analysis report was produced by the University of Virginia Weldon Cooper Center in support of George Mason University's master plan and under contract with DumontJanks.

May 15, 2020



UNIVERSITY
of
VIRGINIA

Weldon Cooper Center
for Public Service
Demographics Research Group

DISCLAIMER

In this report, we used the most recent employment projections for 2026 developed by the Virginia Employment Commission in 2018. The short- and long-term impact of the ongoing Covid-19 pandemic is not and cannot be incorporated in our analysis. Nonetheless, the analysis presents a possible long-range view if all employment sectors recover from the current economic downturn as a result of the pandemic, and then begin to grow again.

As is true with all projections, those produced in this report should be read as suggestive, not determinative. The recent global pandemic demonstrates well that the future is inherently uncertain, making projections of any sort not fully reliable. This report includes projections reported to the single digit, which suggests a high level of precision in predicting the future. Actually, these numbers are the result solely of computation of trends, not by the data producer's ability to project to such detail.

EXECUTIVE SUMMARY

QUESTIONS WE AIMED TO ANSWER

1. Among all occupations requiring a bachelor's degree or higher, which occupational groups and occupations will experience the fastest and largest growth in Virginia?
2. Among all the programs currently offered at Mason, which are projected to experience the fastest and largest increase in market demand?
3. Among programs NOT currently offered at Mason, which are projected to experience large market demand?

A NOTE ABOUT PREDICTING TRENDS

Future occupation and employment trends are difficult to predict due to the complexity and uncertainty of economic, cultural and technological factors. The recent impact of the coronavirus is a case in point. In addition, significant corporate or governmental decisions may impact the outlook of certain sectors. The arrival of Amazon's headquarters in Arlington County, for example, may lead to a significant increase in new jobs in the region, including in associated occupations, such as public policy, law, and business management. On the other hand, the anticipated increase in jobs may not be as great if smaller technology companies are edged out by Amazon.

The University of Virginia Weldon Cooper Center for Public Service was commissioned by DumontJanks to provide enrollment projections by degree program for George Mason University. As part of that work, we produced this analysis of future labor market demand in Virginia¹ by examining expected employment by occupation or occupation cluster (occupations grouped by field and skill requirement) between 2016 and 2026.

MAJOR FINDINGS

JOB TRENDS IN VIRGINIA (2016-2026)

- The share of jobs requiring at least a bachelor's degree is expected to increase from 33 to 35 percent. This equates to an additional 200,000 jobs (14 percent growth).
- The Human Services, Health Sciences, and Information Technology occupational clusters are expected to experience the **fastest growth** (23, 18, and 17 percent, respectively).
- The Business Management & Administration occupational cluster is projected to **add the most jobs** in ten years (37,000), followed by Information Technology (33,000) and Health Sciences (27,000).

ACADEMIC PROGRAMS IN RELATION TO JOB TRENDS

- Among the programs currently offered at Mason, Business, Management, and Marketing; Computer and Information Sciences; and Health Professionals will likely see an increase in demand as occupations in these fields are expected to have the **greatest number of job openings** through 2026.
- Programs in Mathematics as well as in Foreign Languages, Literatures, and Linguistics may also see more demand as occupations in these fields are expected to experience the **highest percentage growth**—28 and 25 percent, respectively. The absolute number of jobs will be small.
- Among programs NOT currently offered at Mason, Residency Programs is an area that will likely attract more students as jobs related to these programs are expected to experience the **fastest job growth** in Virginia.

¹ Based on the most recent official Virginia occupation projections by the Virginia Employment Commission

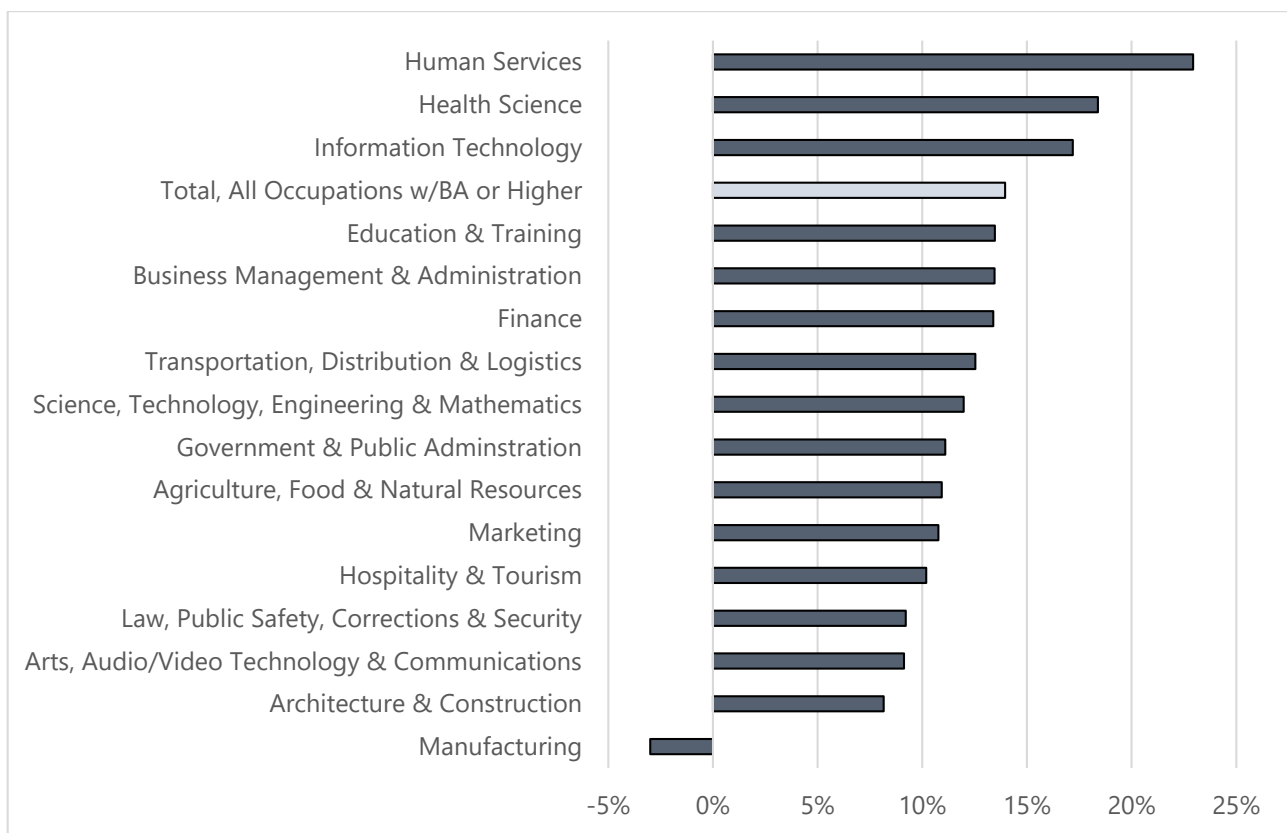
INTRODUCTION

Occupations are increasingly requiring more education and training. In Virginia, nearly 43% of all occupations require a bachelor's degree or higher, and that percentage will continue to increase. By 2026 an increase of nearly 200,000 new jobs requiring at least a four-year college degree is expected. However, this number understates the future need for graduates as it only includes new positions, and excludes openings created by workers retiring from their current positions.

OCCUPATIONAL EMPLOYMENT DEMAND IN VIRGINIA, 2016-2026

Total occupational employment for jobs requiring a bachelor's degree or higher is projected to grow 14 percent from 2016 to 2026 in Virginia. To identify the broad occupational trends, we borrowed the career (or occupation) cluster² concept, which groups hundreds of individual occupations into related families, allowing for easier analysis. *Figure 1* below shows the projected growth by occupation cluster for jobs requiring at least a bachelor's degree in Virginia between 2016 and 2026.

Figure 1: Projected Occupational Employment Growth for Jobs Requiring a Bachelor's Degree or Higher, Virginia, 2016-2026



Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

² The national career cluster framework was developed and is overseen by the National Association of State Directors of Career Technical Education Consortium (<https://careertech.org/career-clusters>)

The Human Services occupation cluster is projected to be the fastest growing in Virginia, climbing 23 percent. Human services workers provide services to help individuals and families meet their personal needs; occupations in this field include social workers, clergy, counselors, and community health workers.

The Health Sciences cluster closely follows with projected employment growth of 18 percent, translating into nearly 27,000 additional workers. Health Sciences workers promote health and wellness; occupations in this field include nurses, physicians, medical lab technicians, and dieticians.

Significant growth is also expected in the Information Technology cluster, with a projected employment increase of around 17 percent, or 33,000 new jobs.

The Business Management & Administration cluster is projected to add the most jobs (37,000) among all clusters—a 13 percent growth rate.

Manufacturing jobs requiring at least a bachelor's degree are projected to decline by 3 percent, or 432 jobs.

The occupations included in each cluster, along with their projected employment change, are detailed in the appendix tables.

MASON PROGRAM EMPLOYMENT DEMAND

To determine the approximate market demand for academic programs, we summarized occupational employment growth estimates by the corresponding academic program. *Tables 1 through 4* below display the projected increase in occupational employment demand by general academic program (as identified by 2-digit Classification of Instructional Programs codes).

Table 1 displays the anticipated percentage employment increase for programs currently offered at George Mason University, or programs that awarded a degree in 2018 according to data from the State Council of Higher Education for Virginia (SCHEV). *Table 2* shows the same information for programs not offered by George Mason in 2018. *Tables 3 and 4* display the total number of projected job openings and the projected number of new graduates needed to fill job openings in Virginia between 2016 and 2026 by program.

- In terms of percentage growth, Foreign Languages, Literatures, and Linguistics programs are expected to experience the highest growth rate at 28 percent; albeit this high growth rate will only require 850 new graduates due to the small number of jobs in these areas. Mathematics and Statistics programs closely follow with a projected growth of 25 percent.
- Perhaps more important to future departmental growth is the absolute number of new graduates needed.
 - Employment associated with Business, Management, Marketing, and Related Support Services programs is expected to grow by 12 percent between 2016 and 2026—an additional need of over 55,000 graduates.
 - Employment related to Health Professions and Related programs is also expected to grow quickly, requiring 30,683 graduates to fill projected jobs—a growth of about 21 percent.
- The highest job growth corresponding to programs currently NOT offered at Mason is Residency Programs (postgraduate education programs for medical students), with demand expected to grow by 19 percent, or an additional 3,330 jobs, between 2016 and 2026 in Virginia. Library Science is another quickly growing program not currently available at Mason.

Table 1: Projected Percentage Virginia Employment Change by Primary CIP Program Offered at Mason

Program CIP Title	Estimated Employment 2016	Projected Employment 2026	Projected Employment Change 2016-2026
Foreign Languages, Literatures, and Linguistics	3,062	3,908	28%
Mathematics and Statistics	4,002	5,016	25%
Health Professions and Related Programs	149,442	180,125	21%
Public Administration and Social Service Professions	30,452	35,942	18%
Family and Consumer Sciences/Human Sciences	10,020	11,729	17%
Computer and Information Sciences and Support Services	210,137	245,894	17%
Parks, Recreation, Leisure, and Fitness Studies	21,646	25,305	17%
Biological and Biomedical Sciences	8,334	9,594	15%
Area, Ethnic, Cultural, Gender, and Group Studies	358	411	15%
History	1,101	1,250	14%
Engineering	71,075	80,425	13%
Social Sciences	10,529	11,848	13%
Communication, Journalism, and Related Programs	10,931	12,267	12%
English Language and Literature/Letters	12,907	14,470	12%
Business, Management, Marketing, and Related Support Services	459,954	515,083	12%
Psychology	46,114	51,562	12%
Education	133,945	149,710	12%
Physical Sciences	5,676	6,325	11%
Multi/Interdisciplinary Studies	2,084	2,318	11%
Communications Technologies/Technicians and Support Services	624	689	10%
Visual and Performing Arts	20,321	22,363	10%
Legal Professions and Studies	33,284	36,461	10%
Homeland Security, Law Enforcement, Firefighting and Related Protective Service	4,364	4,722	8%

Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

Table 2: Projected Percentage Virginia Employment Change by Primary CIP Program Not Offered at Mason

Program CIP Title	Estimated Employment 2016	Projected Employment 2026	Projected Employment Change 2016-2026
Residency Programs	17,157	20,487	19%
Theology and Religious Vocations	2,747	3,223	17%
Science Technologies/Technicians	4,261	4,777	12%
Library Science	6,339	7,065	11%
Natural Resources and Conservation	4,308	4,783	11%
Engineering Technologies and Engineering-Related Fields	4,955	5,425	9%
Transportation and Materials Moving	1,739	1,897	9%
Agriculture, Agriculture Operations, and Related Sciences	1,001	1,082	8%
Architecture and Related Services	6,028	6,430	7%

Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

Table 3: Projected Numeric Virginia Employment Change by Primary CIP Program Offered at Mason

Program CIP Title	Estimated Employment 2016	Projected Employment 2026	Projected # of New Graduates Needed 2016-2026
Business, Management, Marketing, and Related Support Services	459,954	515,083	55,129
Computer and Information Sciences and Support Services	210,137	245,894	35,757
Health Professions and Related Programs	149,442	180,125	30,683
Education	133,945	149,710	15,765
Engineering	71,075	80,425	9,350
Public Administration and Social Service Professions	30,452	35,942	5,490
Psychology	46,114	51,562	5,448
Parks, Recreation, Leisure, and Fitness Studies	21,646	25,305	3,659
Legal Professions and Studies	33,284	36,461	3,177
Visual and Performing Arts	20,321	22,363	2,042
Family and Consumer Sciences/Human Sciences	10,020	11,729	1,709
English Language and Literature/Letters	12,907	14,470	1,563
Communication, Journalism, and Related Programs	10,931	12,267	1,336
Social Sciences	10,529	11,848	1,319
Biological and Biomedical Sciences	8,334	9,594	1,260
Mathematics and Statistics	4,002	5,016	1,014
Foreign Languages, Literatures, and Linguistics	3,062	3,908	846
Physical Sciences	5,676	6,325	649
Homeland Security, Law Enforcement, Firefighting and Related Protective Service	4,364	4,722	358
Multi/Interdisciplinary Studies	2,084	2,318	234
History	1,101	1,250	149
Communications Technologies/Technicians and Support Services	624	689	65

Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

Table 4: Projected Numeric Virginia Employment Change by Primary CIP Program not Offered at Mason

Program CIP Title	Estimated Employment 2016	Projected Employment 2026	Projected # of New Graduates Needed 2016-2026
Residency Programs	17,157	20,487	3,330
Library Science	6,339	7,065	726
Science Technologies/Technicians	4,261	4,777	516
Theology and Religious Vocations	2,747	3,223	476
Natural Resources and Conservation	4,308	4,783	475
Engineering Technologies and Engineering-Related Fields	4,955	5,425	470
Architecture and Related Services	6,028	6,430	402
Transportation and Materials Moving	1,739	1,897	158
Agriculture, Agriculture Operations, and Related Sciences	1,001	1,082	81

Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

25 OCCUPATIONS WITH THE LARGEST GAINS AND THEIR ASSOCIATED ACADEMIC PROGRAMS

Overall, growth can be expected in nearly all occupations requiring at least a bachelor’s degree, but the highest growth is estimated in occupations related to Human Services, Health Services, Information Technology, and Business Management & Administration. VEC projections indicate the following 25 occupations will add the greatest number of new employees through 2026 (table 5).

- Of these 25 fast-growing occupations, many are in the fields of Computer and Information Sciences and Support Services programs; and Business, Management, Marketing, and Related Support Services programs. For example, nearly 12,000 new Software Developer jobs and 11,000 new Management Analysts jobs will be needed to meet the demand.
- Occupations focused on serving the growing and aging population are prominent on the list. Academic programs, such as Health Professions, will help prepare future health care workers to fill over 9,000 Registered Nurse positions.
- The demand for educators is also increasing. The VEC projects there will be nearly 4,000 Elementary School Teacher positions and 3,000 Secondary School Teacher positions available.

Table 5: Top 25 occupations projected to experience the highest numeric growth, 2016- 2026

Occupation Title	Occupation Cluster	Numeric Emp. Change 2016-2026	Percent Emp. Change 2016-2026	Primary Corresponding Program
Software Developers, Applications	Information Technology	11,710	33%	Computer and Information Sciences and Support Services
Management Analysts	Business Management & Administration	10,686	18%	Business, Management, Marketing, and Related Support Services
Registered Nurses	Health Science	9,341	14%	Health Professions and Related Programs
Accountants and Auditors	Finance	6,151	14%	Business, Management, Marketing, and Related Support Services
General and Operations Managers	Business Management & Administration	6,099	11%	Business, Management, Marketing, and Related Support Services
Market Research Analysts and Marketing Specialists	Marketing	5,149	27%	Business, Management, Marketing, and Related Support Services
Information Security Analysts	Information Technology	4,867	42%	Computer and Information Sciences and Support Services
Managers, All Other	Business Management & Administration	4,589	11%	Psychology
Elementary School Teachers, Except Special Education	Education & Training	3,982	12%	Education
Software Developers, Systems Software	Information Technology	3,731	15%	Computer and Information Sciences and Support Services
Business Operations Specialists, All Other	Business Management & Administration	3,549	11%	No specific program
Computer Systems Analysts	Information Technology	3,537	13%	Computer and Information Sciences and Support Services
Sales Representatives, Services, All Other	Marketing	3,420	12%	Business, Management, Marketing, and Related Support Services
Mental Health Counselors	Human Services	3,341	35%	Health Professions and Related Programs
Secondary School Teachers	Education & Training	2,960	12%	Education

Occupation Title	Occupation Cluster	Numeric Emp. Change 2016-2026	Percent Emp. Change 2016-2026	Primary Corresponding Program
Operations Research Analysts	Business Management & Administration	2,958	37%	Engineering
Financial Managers	Finance	2,910	21%	Business, Management, Marketing, and Related Support Services
Computer User Support Specialists	Information Technology	2,672	13%	Computer and Information Sciences and Support Services
Human Resources Specialists	Business Management & Administration	2,187	11%	Business, Management, Marketing, and Related Support Services
Lawyers	Law, Public Safety, Corrections & Security	2,134	10%	Legal Professions and Studies
Network and Computer Systems Administrators	Information Technology	2,114	11%	Computer and Information Sciences and Support Services
Fitness Trainers and Aerobics Instructors	Human Services	2,066	16%	Parks, Recreation, Leisure, and Fitness Studies
Nurse Practitioners	Health Science	2,049	44%	Health Professions and Related Programs
Child, Family, and School Social Workers	Human Services	2,037	23%	Public Administration and Social Service Professions
Computer and Information Systems Managers	Business Management & Administration	1,947	14%	Computer and Information Sciences and Support Services

Source: Virginia Employment Commission (VEC), National Center for Education Statistics (NCES)

Academic programs that provide training for these 25 occupations will need to grow to meet demand.

Table 7 outlines degrees awarded by Mason in 2018.

Many programs with high occupational demand are offered at Mason and have large numbers of degree completers. Four Mason program areas are listed in table 6 along with the number of degrees awarded in 2018 and the percentage of annual market demand in Virginia that could be met by the number of degrees awarded by Mason.

Table 6: Examples of Mason programs well positioned to meet market demand

Program Areas	Degrees awarded in 2018	The percentage of projected annual demand in Virginia that could be met by the number of degrees awarded for occupations in this field
Business, Management, Marketing, and Related Support Services	nearly 10,000	About 25%
Computer and Information Sciences and Support Services	nearly 1,000	About 25%
Health Profession and Related Programs	About 700	Just under 20% <i>Health Profession occupations are third highest in both numeric and percentage growth.</i>
Education	Just over 1,200	80%

These shares of annual job growth reflect only additional openings and do not include demand from either turnover in current positions or from outside the state of Virginia. In the case of Education, jobs in this field have a high turnover rate, so even though Mason degree completions may seem high (in terms of percentage of annual growth), there is still a demand for replacement workers.

There is potential room to grow the Mason programs of Business, Management, Marketing, and Related Support Services; Computer and Information Sciences and Support Services; and especially Health Professions and Related Programs. As an extension of health professions, Residency Programs, which are in demand and not currently offered at Mason, could be a potential growth area.

Table 7: Mason programs that awarded degrees in 2018 by CIP title and code

CIP CODE	CIP Title	Degrees Awarded in 2018
99	Grand total	9569
52	Business, Management, Marketing, and Related Support Services	1447
13	Education	1261
11	Computer and Information Sciences and Support Services	949
45	Social Sciences	804
51	Health Professions and Related Programs	713
14	Engineering	507
26	Biological and Biomedical Sciences	502
43	Homeland Security, Law Enforcement, Firefighting, and Related Protective Service	475
42	Psychology	448
44	Public Administration and Social Service Professions	426
23	English Language and Literature/Letters	376
50	Visual and Performing Arts	323
24	Liberal Arts and Sciences, General Studies and Humanities	312
30	Multi/Interdisciplinary Studies	271
22	Legal Professions and Studies	155
40	Physical Sciences	128
54	History	117
27	Mathematics and Statistics	89
31	Parks, Recreation, Leisure and Fitness Studies	62
10	Communications Technologies/Technicians and Support Services	47
03	Natural Resources and Conservation	45
16	Foreign Languages, Literatures, and Linguistics	42
38	Philosophy and Religious Studies	29
05	Area, Ethnic, Cultural, Gender, and Group Studies	17
09	Communication, Journalism, and Related Programs	14
19	Family and Consumer Sciences/Human Sciences	10

Source: State Council of Higher Education for Virginia (SCHEV)



LIMITATIONS

These projections reflect trends expected in additional new jobs, not anticipated openings created by individuals leaving or retiring from their current positions. As a result, the projections may understate the future need for graduates.

The market demand analysis does not include new jobs in Washington DC. Virginia was chosen as the primary focus of the analysis because it has the largest share (nearly 50 percent) of Domestic Regional Product in the Washington DC metropolitan, followed by Maryland (nearly 30 percent) and the District (under 25 percent)³. In addition, Virginia was home to 72 percent of new jobs created in the Washington metropolitan area in 2018⁴. Finally, background research indicates that Virginia employment trends closely represent those in DC⁵. For example, projections for both Virginia and DC show identical percentages of growth in Human Services and Health Sciences occupations, and the greatest number of new jobs are in Business Management & Administration occupations in both places.

Employment numbers indicate demand by occupation for the entire state of Virginia, not just for Northern Virginia or only for Mason graduates. As the largest state university in the most populous region of Virginia, Mason is well-positioned to supply a significant portion of needed workers in the Commonwealth.

Occupations have been matched to programs based on the predominant degree type leading to a particular occupation. Since multiple two-digit CIP codes programs can match to an occupation (*see About the Data, page 14*), the most common program that matches with the occupation is used to avoid double counting. As a result, additional programs corresponding to growing occupations are not captured in the data. For example, Secondary Teachers may have a degree in Education or in their field of instruction, such as Computer Science. However, for consistency and to avoid duplication, all Secondary Teachers are matched with the Education CIP program, not their field of study, since the majority of Secondary Teachers complete education programs.

Finally, the future is uncertain, as our recent experience with the pandemic has shown. Consequently, the best use of projections is to indicate trends. For the near term of 2016-2026, the projections can neither predict how the complex and rapidly changing field of technology will affect job types (for example, artificial intelligence and automation may transform some occupations), nor where people work (for example, working from home which may make employee-employer location less relevant).

The most recent projections cannot include all anticipated, on-the-ground factors quickly enough. For example, the new Amazon headquarters in Northern Virginia is expected to add 25,000 full-time jobs over a 12-year period, and associated occupations are expected to grow to support these new jobs. This recent development is not taken into account in the VEC occupation employment projections, and even if it had, determining how many jobs will be created is hard to assess accurately. Some of the new jobs brought by Amazon could be filled by tech talent from smaller tech companies in the region that were squeezed out by Amazon. Another factor that could alter workforce needs in Northern Virginia is the proposed migration of some federal offices out of DC⁶.

³ Source: The Stephen S. Fuller Institute at the Schar School, George Mason University

⁴ Source: U.S. Bureau of Labor Statistics

⁵ District of Columbia Department of Employment Services

⁶ <https://www.federaltimes.com/management/2019/10/24/these-senators-want-to-move-agency-headquarters-out-of-dc/>



A NOTE ABOUT UNEVEN COVID-19 SECTOR IMPACTS

The COVID-19 pandemic will inevitably affect occupational employment. Due to the ongoing and unpredictable nature of the pandemic, it is impossible to predict the length of time of this impact and the severity of changes to occupational employment from this baseline.

Past recessions can be characterized by different patterns of employment recovery. If this downturn follows a V shape and quickly recovers, we may see little change to the 2026 projections presented. However, if the COVID-19 pandemic is prolonged and economic recovery takes a U shape, we may see decreases in expected 2026 employment.

We can estimate the impacts in a few broad occupational areas due to the unique ways a pandemic suppresses economic activity. The effects of the COVID-19 pandemic will be most pronounced for **service industry occupations** that rely on discretionary spending. These service-focused clusters primarily include Human Services; Hospitality & Tourism; Arts, Audio/Video Technology & Communications; and Business Management & Administration occupations that focus on retail. The length of mandated closures and general consumer spending will determine how quickly these occupations rebound.

Public sector occupations will see a slowing of employment due to budgets contracting with lower tax revenues. Governmental hiring freezes implemented in response will determine the extent to which these occupations begin growing again, but they will likely not decrease to the same extent as other sectors. This will impact occupation clusters such as Government & Public Administration; Education & Training; and Law, Public Safety, Corrections, & Security.

Professional and business services occupations should suffer the least pandemic-related impact—such as those in Finance; Marketing; Information Technology; Business Management & Administration; and Science, Technology, Engineering & Mathematics. The ability to conduct business remotely will likely limit economic losses to industries that hire for these occupations. Transportation, Distribution, & Logistics occupations could see little employment impact due to the increased necessity of delivering goods.

Finally, the economic impact on **health sciences** employment will be unique to this sector. The health care industry undeniably now needs an influx of workers to care for the increase in intensive care patients. However, the mandated decreases in non-essential procedures, preventive care, and non-urgent visits causes a financial burden on health care systems. Employment in health sciences will decrease during the peak of the pandemic, but likely will be one of the first clusters to return to the baseline.

It is important to note that occupations requiring a bachelor's degree or higher (as presented in this report) may generally see less of an impact in employment change. Workers in occupations requiring higher education generally are more able to conduct business remotely and thus may suffer fewer economic effects than those working in industries that rely on low wage, lower educated employees and face-to-face interaction with customers (such as retail, hospitality, and tourism).

CONCLUSION

This report provides an analysis of short-term occupation and employment projections for Virginia which require a post-secondary degree, and a customized examination of employment outlook by academic programs offered by George Mason University. Mason's comprehensive programs, especially in the fields of information sciences, engineering, business administration, and health professions, coupled with its exceptional proximity to job markets, suggest that the University is well positioned to meet future employment needs in the Commonwealth. This report, together with the report on Virginia demographic and high school graduation trends, will provide a useful context for understanding the Mason enrollment projections.

ABOUT THE DATA

The employment estimates and projections presented in this analysis were developed by the Virginia Employment Commission (VEC) and analyzed by the Weldon Cooper Center for Public Service. Every two years, the U.S. Bureau of Labor Statistics (BLS) releases new national employment projections for over 800 different occupations. Using this information, VEC develops the official occupational employment projections for the Commonwealth of Virginia⁷. In this analysis, only occupations that require an education of bachelor's degree or higher were included, since the purpose was to examine employment by college degree program.

To estimate occupational growth by academic program, we used a crosswalk developed by the National Center for Education Statistics (NCES)⁸ to match occupations to instructional programs. 2010 Standard Occupational Classification (SOC) codes are mapped to 2010 Classification of Instructional Programs (CIP) codes.

The Classification of Instructional Programs (CIP) is a taxonomic coding scheme of instructional programs developed by the U.S. Department of Education's NCES⁹. Instructional programs for this analysis are summarized at the two-digit CIP level. Detailed programs under each two-digit CIP code can be found on the NCES website¹⁰.

A CIP-SOC relationship indicates that programs classified in the CIP category prepare individuals directly for jobs classified in the SOC category. Relationships between CIP and SOC may be one-to-one, one-to-many, many-to-one, or many-to-many. Since SOC codes tend to be more specific than CIP codes, it is likely that one CIP code will map to multiple SOC codes. In this study, the most common program is matched with the occupation to illustrate projected need in that field.

⁷ Virginia Employment Commission (2018), Long-Term Occupational 2016-2026 Projections
<https://viriniaworks.com/occupational-projections>

⁸ National Center for Education Statistics, Classification of Instructional Programs, SOC 2010 to CIP 2010 crosswalk,
https://nces.ed.gov/ipeds/cipcode/Files/FINALSOCtoCIPcrosswalk_022811.xls

⁹ <https://nces.ed.gov/ipeds/cipcode/>

¹⁰ <https://nces.ed.gov/ipeds/cipcode/browse.aspx?y=55>

APPENDIX

The occupation clusters are numbered one through sixteen and are ordered in terms of projected percentage growth between 2016 and 2026 in Virginia, with the highest growth clusters listed first. Under each occupation cluster, highlighted in gray, are the three occupations with the greatest need for new employees. Primary corresponding programs that are currently not offered at George Mason University are marked with an asterisk (*).

I. HUMAN SERVICES

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Human Services	15,283	23%	
193031	Clinical, Counseling, and School Psychologists	562	18%	Psychology
193032	Industrial-Organizational Psychologists	34	7%	Psychology
193039	Psychologists, All Other	57	13%	Psychology
211011	Substance Abuse and Behavioral Disorder Counselors	876	29%	Health Professions and Related Programs
211013	Marriage and Family Therapists	371	35%	Health Professions and Related Programs
211014	Mental Health Counselors	3,341	35%	Health Professions and Related Programs
211015	Rehabilitation Counselors	917	28%	Health Professions and Related Programs
211019	Counselors, All Other	163	28%	Public Administration and Social Service Professions
211023	Mental Health and Substance Abuse Social Workers	1,045	24%	Public Administration and Social Service Professions
119151	Social and Community Service Managers	626	23%	Public Administration and Social Service Professions
211021	Child, Family, and School Social Workers	2,037	23%	Public Administration and Social Service Professions
211022	Healthcare Social Workers	768	25%	Public Administration and Social Service Professions
211029	Social Workers, All Other	74	12%	Public Administration and Social Service Professions
211091	Health Educators	298	25%	Health Professions and Related Programs

HUMAN SERVICES (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
211093	Social and Human Service Assistants	1,405	21%	Family and Consumer Sciences/Human Sciences
211094	Community Health Workers	112	21%	Health Professions and Related Programs
211099	Community and Social Service Specialists, All Other	175	9%	Public Administration and Social Service Professions
212011	Clergy	208	17%	Theology and Religious Vocations*
212021	Directors, Religious Activities and Education	110	19%	Theology and Religious Vocations*
212099	Religious Workers, All Other	15	14%	Theology and Religious Vocations*
119061	Funeral Service Managers	23	4%	Personal and Culinary Services*
399031	Fitness Trainers and Aerobics Instructors	2,066	16%	Parks, Recreation, Leisure, and Fitness Studies

II. HEALTH SCIENCE

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Health Science	26,784	18%	
172031	Biomedical Engineers	30	13%	Engineering
191042	Medical Scientists, Except Epidemiologists	374	19%	Biological and Biomedical Sciences
191041	Epidemiologists	9	8%	Biological and Biomedical Sciences
292011	Medical and Clinical Laboratory Technologists	720	16%	Health Professions and Related Programs
292012	Medical and Clinical Laboratory Technicians	710	17%	Health Professions and Related Programs
119111	Medical and Health Services Managers	1,834	24%	Health Professions and Related Programs
291011	Chiropractors	156	13%	Health Professions and Related Programs
291021	Dentists, General	883	24%	Health Professions and Related Programs
291022	Oral and Maxillofacial Surgeons	50	25%	Residency Programs*
291029	Dentists, All Other Specialists	17	17%	Health Professions and Related Programs
291031	Dietitians and Nutritionists	199	15%	Family and Consumer Sciences/Human Sciences
291041	Optometrists	276	20%	Health Professions and Related Programs
291051	Pharmacists	485	7%	Health Professions and Related Programs
291061	Anesthesiologists	112	19%	Residency Programs*
291062	Family and General Practitioners	887	19%	Health Professions and Related Programs

HEALTH SCIENCE (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
291063	Internists, General	317	21%	Residency Programs*
291064	Obstetricians and Gynecologists	220	22%	Residency Programs*
291065	Pediatricians, General	179	18%	Residency Programs*
291066	Psychiatrists	137	14%	Residency Programs*
291067	Surgeons	175	18%	Residency Programs*
291069	Physicians and Surgeons, All Other	1297	16%	Residency Programs*
291071	Physician Assistants	1,105	45%	Health Professions and Related Programs
291122	Occupational Therapists	799	26%	Health Professions and Related Programs
291123	Physical Therapists	1,867	30%	Health Professions and Related Programs
291124	Radiation Therapists	37	9%	Health Professions and Related Programs
291125	Recreational Therapists	30	8%	Health Professions and Related Programs
291127	Speech-Language Pathologists	700	21%	Health Professions and Related Programs
291128	Exercise Physiologists	147	12%	Biological and Biomedical Sciences
291129	Therapists, All Other	32	14%	Health Professions and Related Programs
291131	Veterinarians	843	29%	Residency Programs*
291141	Registered Nurses	9,341	14%	Health Professions and Related Programs
291151	Nurse Anesthetists	205	22%	Health Professions and Related Programs
291171	Nurse Practitioners	2,049	44%	Health Professions and Related Programs

HEALTH SCIENCE (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
291181	Audiologists	98	23%	Health Professions and Related Programs
291199	Health Diagnosing and Treating Practitioners, All Other	74	15%	Health Professions and Related Programs
292091	Orthotists and Prosthetists	36	32%	Health Professions and Related Programs
299091	Athletic Trainers	236	29%	Health Professions and Related Programs
299099	Healthcare Practitioners and Technical Workers, All Other	118	12%	Health Professions and Related Programs

III. INFORMATION TECHNOLOGY

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Information Technology	33,037	17%	
151151	Computer User Support Specialists	2,672	13%	Computer and Information Sciences and Support Services
151199	Computer Occupations, All Other	1,538	12%	Computer and Information Sciences and Support Services
151122	Information Security Analysts	4,867	42%	Computer and Information Sciences and Support Services
151141	Database Administrators	873	15%	Computer and Information Sciences and Support Services
151142	Network and Computer Systems Administrators	2,114	11%	Computer and Information Sciences and Support Services
151143	Computer Network Architects	1,177	11%	Computer and Information Sciences and Support Services
151152	Computer Network Support Specialists	684	9%	Computer and Information Sciences and Support Services
151121	Computer Systems Analysts	3,537	13%	Computer and Information Sciences and Support Services
151131	Computer Programmers	-602	-6%	Computer and Information Sciences and Support Services
151132	Software Developers, Applications	11,710	33%	Computer and Information Sciences and Support Services
151133	Software Developers, Systems Software	3,731	15%	Computer and Information Sciences and Support Services
151134	Web Developers	736	16%	Computer and Information Sciences and Support Services

IV. EDUCATION & TRAINING

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Education & Training	24,359	14%	
119031	Education Administrators, Preschool and Childcare Center	94	9%	Education
119032	Education Administrators, Elementary and Secondary School	775	12%	Education
119033	Education Administrators, Postsecondary	437	14%	Education
119039	Education Administrators, All Other	158	13%	Education
211012	Educational, Guidance, School, and Vocational Counselors	1,169	18%	Education
254011	Archivists	12	11%	Multi/Interdisciplinary Studies
254012	Curators	52	13%	Multi/Interdisciplinary Studies
254013	Museum Technicians and Conservators	41	12%	Multi/Interdisciplinary Studies
254021	Librarians	474	12%	Library Science*
254031	Library Technicians	252	11%	Library Science*
259011	Audio-Visual and Multimedia Collections Specialists	31	12%	Education
259031	Instructional Coordinators	682	14%	Education
273091	Interpreters and Translators	846	28%	Foreign Languages, Literatures, and Linguistics

EDUCATION & TRAINING (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
251011	Business Teachers, Postsecondary	564	23%	Business, Management, Marketing, and Related Support Services
251021	Computer Science Teachers, Postsecondary	162	12%	Computer and Information Sciences and Support Services
251022	Mathematical Science Teachers, Postsecondary	243	14%	Mathematics and Statistics
251031	Architecture Teachers, Postsecondary	15	14%	Architecture and Related Services*
251032	Engineering Teachers, Postsecondary	131	19%	Engineering
251042	Biological Science Teachers, Postsecondary	332	19%	Biological and Biomedical Sciences
251051	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary	41	14%	Physical Sciences
251052	Chemistry Teachers, Postsecondary	98	14%	Physical Sciences
251054	Physics Teachers, Postsecondary	53	14%	Physical Sciences
251061	Anthropology and Archeology Teachers, Postsecondary	13	13%	Social Sciences
251062	Area, Ethnic, and Cultural Studies Teachers, Postsecondary	53	15%	Area, Ethnic, Cultural, Gender, and Group Studies
251063	Economics Teachers, Postsecondary	70	15%	Social Sciences
251064	Geography Teachers, Postsecondary	23	13%	Social Sciences
251065	Political Science Teachers, Postsecondary	115	15%	Social Sciences
251066	Psychology Teachers, Postsecondary	206	20%	Psychology

EDUCATION & TRAINING (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
251067	Sociology Teachers, Postsecondary	51	14%	Social Sciences
251071	Health Specialties Teachers, Postsecondary	1,563	31%	Health Professions and Related Programs
251072	Nursing Instructors and Teachers, Postsecondary	454	28%	Health Professions and Related Programs
251111	Criminal Justice and Law Enforcement Teachers, Postsecondary	49	17%	Homeland Security, Law Enforcement, Firefighting and Related Protective Service
251112	Law Teachers, Postsecondary	96	17%	Legal Professions and Studies
251113	Social Work Teachers, Postsecondary	53	14%	Public Administration and Social Service Professions
251123	English Language and Literature Teachers, Postsecondary	317	14%	English Language and Literature/Letters
251125	History Teachers, Postsecondary	136	14%	History
251126	Philosophy and Religion Teachers, Postsecondary	143	17%	Theology and Religious Vocations*
251191	Graduate Teaching Assistants	321	12%	N/A*
251194	Vocational Education Teachers, Postsecondary	97	5%	Education
252011	Preschool Teachers, Except Special Education	782	8%	Education
252012	Kindergarten Teachers, Except Special Education	541	12%	Education
252021	Elementary School Teachers, Except Special Education	3,982	12%	Education
252022	Middle School Teachers, Except Special and Career/Technical	1,830	12%	Education

EDUCATION & TRAINING (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
252023	Career/Technical Education Teachers, Middle School	40	11%	Education
252031	Secondary School Teachers, Except Special and Career/Technical Education	2,960	12%	Education
252032	Career/Technical Education Teachers, Secondary School	264	11%	Education
252051	Special Education Teachers, Preschool	72	12%	Education
252052	Special Education Teachers, Kindergarten and Elementary School	565	11%	Education
252053	Special Education Teachers, Middle School	300	11%	Education
252054	Special Education Teachers, Secondary School	456	11%	Education
252059	Special Education Teachers, All Other	290	15%	Education
259021	Farm and Home Management Advisors	37	10%	Family and Consumer Sciences/Human Sciences
259099	Education, Training, and Library Workers, All Other	240	13%	Education
272022	Coaches and Scouts	1,578	18%	Parks, Recreation, Leisure, and Fitness Studies

V. BUSINESS MANAGEMENT & ADMINISTRATION

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Business Management & Administration	37,003	14%	
433061	Procurement Clerks	-37	-2%	Business, Management, Marketing, and Related Support Services
434121	Library Assistants, Clerical	282	11%	N/A*
113021	Computer and Information Systems Managers	1,947	14%	Computer and Information Sciences and Support Services
111011	Chief Executives	-123	-1%	Business, Management, Marketing, and Related Support Services
111021	General and Operations Managers	6,099	11%	Business, Management, Marketing, and Related Support Services
119199	Managers, All Other	4,589	11%	Psychology
113111	Compensation and Benefits Managers	18	5%	Business, Management, Marketing, and Related Support Services
113121	Human Resources Managers	433	12%	Business, Management, Marketing, and Related Support Services
113131	Training and Development Managers	134	14%	Business, Management, Marketing, and Related Support Services
131071	Human Resources Specialists	2,187	11%	Business, Management, Marketing, and Related Support Services
131075	Labor Relations Specialists	16	1%	Business, Management, Marketing, and Related Support Services

BUSINESS MANAGEMENT & ADMINISTRATION (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
131141	Compensation, Benefits, and Job Analysis Specialists	277	12%	Business, Management, Marketing, and Related Support Services
131151	Training and Development Specialists	1,891	17%	Business, Management, Marketing, and Related Support Services
113011	Administrative Services Managers	504	12%	Business, Management, Marketing, and Related Support Services
113051	Industrial Production Managers	-18	-1%	Business, Management, Marketing, and Related Support Services
113061	Purchasing Managers	265	10%	Business, Management, Marketing, and Related Support Services
131111	Management Analysts	10,686	18%	Business, Management, Marketing, and Related Support Services
131121	Meeting, Convention, and Event Planners	729	17%	Business, Management, Marketing, and Related Support Services
131131	Fundraisers	617	23%	N/A*
131199	Business Operations Specialists, All Other	3,549	11%	N/A*
152031	Operations Research Analysts	2958	37%	Engineering

VI. FINANCE

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Finance	15,378	13%	
132011	Accountants and Auditors	6,151	14%	Business, Management, Marketing, and Related Support Services
132041	Credit Analysts	188	10%	Business, Management, Marketing, and Related Support Services
132072	Loan Officers	1,352	14%	Business, Management, Marketing, and Related Support Services
433099	Financial Clerks, All Other	55	10%	N/A*
113031	Financial Managers	2,910	21%	Business, Management, Marketing, and Related Support Services
132031	Budget Analysts	454	12%	Business, Management, Marketing, and Related Support Services
132082	Tax Preparers	512	17%	Business, Management, Marketing, and Related Support Services
131031	Claims Adjusters, Examiners, and Investigators	-30	-1%	Business, Management, Marketing, and Related Support Services
131032	Insurance Appraisers, Auto Damage	23	4%	Mechanic and Repair Technologies/Technicians
132053	Insurance Underwriters	-111	-5%	Business, Management, Marketing, and Related Support Services
413021	Insurance Sales Agents	1,236	10%	Business, Management, Marketing, and Related Support Services

FINANCE (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
132052	Personal Financial Advisors	1,338	22%	Business, Management, Marketing, and Related Support Services
132099	Financial Specialists, All Other	530	11%	Business, Management, Marketing, and Related Support Services
413031	Securities, Commodities, and Financial Services Sales Agents	598	11%	Business, Management, Marketing, and Related Support Services
434011	Brokerage Clerks	172	13%	Business, Management, Marketing, and Related Support Services

VII. TRANSPORTATION, DISTRIBUTION & LOGISTICS

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Transportation, Distribution & Logistics	1,129	13%	
131081	Logisticians	971	13%	Business, Management, Marketing, and Related Support Services
532012	Commercial Pilots	40	7%	Transportation and Materials Moving*
532021	Air Traffic Controllers	118	10%	Transportation and Materials Moving*

VIII. SCIENCE, TECHNOLOGY, ENGINEERING & MATHEMATICS

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Science, Technology, Engineering & Mathematics	8,126	12%	
119041	Architectural and Engineering Managers	353	9%	Engineering
172011	Aerospace Engineers	291	12%	Engineering
172041	Chemical Engineers	92	8%	Engineering
172061	Computer Hardware Engineers	147	11%	Engineering
172071	Electrical Engineers	772	12%	Engineering
172072	Electronics Engineers, Except Computer	417	8%	Engineering
172111	Health and Safety Engineers, Except Mining Safety Engineers	47	8%	Engineering
172112	Industrial Engineers	327	9%	Engineering
172121	Marine Engineers and Naval Architects	326	19%	Engineering
172131	Materials Engineers	3	1%	Engineering
172141	Mechanical Engineers	738	11%	Engineering
172161	Nuclear Engineers	237	9%	Engineering
172171	Petroleum Engineers	25	8%	Engineering
172199	Engineers, All Other	516	11%	Engineering

SCIENCE, TECHNOLOGY, ENGINEERING, & MATHEMATICS (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
151111	Computer and Information Research Scientists	611	23%	Computer and Information Sciences and Support Services
152021	Mathematicians	170	34%	Mathematics and Statistics
152041	Statisticians	513	43%	Mathematics and Statistics
152099	Mathematical Science Occupations, All Other	88	17%	Mathematics and Statistics
171021	Cartographers and Photogrammetrists	98	21%	Engineering Technologies and Engineering-Related Fields*
191021	Biochemists and Biophysicists	84	17%	Biological and Biomedical Sciences
191022	Microbiologists	50	13%	Biological and Biomedical Sciences
191029	Biological Scientists, All Other	75	12%	Biological and Biomedical Sciences
191031	Conservation Scientists	97	14%	Natural Resources and Conservation
191099	Life Scientists, All Other	14	7%	Biological and Biomedical Sciences
192012	Physicists	123	14%	Physical Sciences
192021	Atmospheric and Space Scientists	73	18%	Physical Sciences
192031	Chemists	60	4%	Physical Sciences
192032	Materials Scientists	16	5%	Physical Sciences
192041	Environmental Scientists and Specialists, Including Health	335	11%	Natural Resources and Conservation
192042	Geoscientists, Except Hydrologists and Geographers	53	12%	Physical Sciences

SCIENCE, TECHNOLOGY, ENGINEERING, & MATHEMATICS (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
192099	Physical Scientists, All Other	129	10%	Multi/Interdisciplinary Studies
193011	Economists	90	7%	Social Sciences
193091	Anthropologists and Archeologists	14	8%	Social Sciences
193093	Historians	13	8%	History
193094	Political Scientists	27	3%	Social Sciences
193099	Social Scientists and Related Workers, All Other	866	16%	Social Sciences
194061	Social Science Research Assistants	50	6%	Social Sciences
194099	Life, Physical, and Social Science Technicians, All Other	186	11%	Science Technologies/Technicians*

IX: GOVERNMENT & PUBLIC ADMINISTRATION

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Government & Public Administration	2,642	11%	
111031	Legislators	58	10%	Public Administration and Social Service Professions
131041	Compliance Officers	994	13%	N/A*
132061	Financial Examiners	306	18%	Business, Management, Marketing, and Related Support Services
193051	Urban and Regional Planners	182	15%	Architecture and Related Services*
119131	Postmasters and Mail Superintendents	-60	-16%	Public Administration and Social Service Professions
119161	Emergency Management Directors	54	12%	Homeland Security, Law Enforcement, Firefighting and Related Protective Service
434061	Eligibility Interviewers, Government Programs	381	10%	Public Administration and Social Service Professions
299011	Occupational Health and Safety Specialists	218	7%	Engineering Technologies and Engineering-Related Fields*
299012	Occupational Health and Safety Technicians	56	13%	Health Professions and Related Programs
452011	Agricultural Inspectors	62	8%	Agriculture, Agriculture Operations, and Related Sciences*
132021	Appraisers and Assessors of Real Estate	314	16%	Business, Management, Marketing, and Related Support Services
132081	Tax Examiners and Collectors, and Revenue Agents	77	5%	Business, Management, Marketing, and Related Support Services

X. AGRICULTURE, FOOD, & NATURAL RESOURCES

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Agriculture, Food & Natural Resources	681	10.9%	
172081	Environmental Engineers	114	9%	Engineering
194091	Environmental Science and Protection Technicians	62	9%	Science Technologies/ Technicians*
119121	Natural Sciences Managers	152	12%	Engineering
191023	Zoologists and Wildlife Biologists	23	8%	Natural Resources and Conservation
191032	Foresters	18	6%	Natural Resources and Conservation
194093	Forest and Conservation Technicians	25	9%	Natural Resources and Conservation
191013	Soil and Plant Scientists	19	8%	Agriculture, Agriculture Operations, and Related Sciences*
194021	Biological Technicians	268	15%	Science Technologies/ Technicians*

XI. MARKETING

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Marketing	15,527	11%	
273031	Public Relations Specialists	1,147	16%	Communication, Journalism, and Related Programs
112011	Advertising and Promotions Managers	28	11%	Communication, Journalism, and Related Programs
112021	Marketing Managers	514	13%	Business, Management, Marketing, and Related Support Services
112022	Sales Managers	509	9%	Business, Management, Marketing, and Related Support Services
112031	Public Relations and Fundraising Managers	187	15%	Communication, Journalism, and Related Programs
119141	Property, Real Estate, and Community Association Managers	447	10%	Business, Management, Marketing, and Related Support Services
131161	Market Research Analysts and Marketing Specialists	5,149	27%	Business, Management, Marketing, and Related Support Services
411012	First-Line Supervisors of Non-Retail Sales Workers	826	8%	Business, Management, Marketing, and Related Support Services
413011	Advertising Sales Agents	143	6%	Business, Management, Marketing, and Related Support Services
413099	Sales Representatives, Services, All Other	3,420	12%	Business, Management, Marketing, and Related Support Services
414011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	437	7%	Business, Management, Marketing, and Related Support Services

MARKETING (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
414012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	1,455	5%	Business, Management, Marketing, and Related Support Services
419021	Real Estate Brokers	150	4%	Business, Management, Marketing, and Related Support Services
419022	Real Estate Sales Agents	805	5%	Business, Management, Marketing, and Related Support Services
419031	Sales Engineers	170	9%	N/A*
419099	Sales and Related Workers, All Other	140	14%	Business, Management, Marketing, and Related Support Services

XII. HOSPITALITY & TOURISM

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Hospitality & Tourism	1,434	10%	
119081	Lodging Managers	57	4%	Business, Management, Marketing, and Related Support Services
272021	Athletes and Sports Competitors	15	7%	Parks, Recreation, Leisure, and Fitness Studies
272023	Umpires, Referees, and Other Sports Officials	94	13%	N/A*
399032	Recreation Workers	1,268	11%	N/A*

XIII. LAW, PUBLIC SAFETY, CORRECTIONS & SECURITY

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Law, Public Safety, Corrections & Security	3,987	9%	
211092	Probation Officers and Correctional Treatment Specialists	170	5%	Public Administration and Social Service Professions
194092	Forensic Science Technicians	132	19%	Physical Sciences
333021	Detectives and Criminal Investigators	255	7%	Homeland Security, Law Enforcement, Firefighting and Related Protective Service
231011	Lawyers	2,134	10%	Legal Professions and Studies
231021	Administrative Law Judges, Adjudicators, and Hearing Officer	38	7%	Legal Professions and Studies
232093	Title Examiners, Abstractors, and Searchers	14	1%	Legal Professions and Studies
232099	Legal Support Workers, All Other	895	9%	Legal Professions and Studies
339099	Protective Service Workers, All Other	349	11%	N/A*

XIV. ARTS, AUDIO/VIDEO TECHNOLOGY & COMMUNICATIONS

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Arts, Audio/Video Technology & Communications	3252	9%	
273011	Radio and Television Announcers	-129	-15%	Communication, Journalism, and Related Programs
273022	Reporters and Correspondents	47	6%	Communication, Journalism, and Related Programs
273041	Editors	487	11%	English Language and Literature/Letters
273042	Technical Writers	410	15%	English Language and Literature/Letters
273043	Writers and Authors	349	10%	English Language and Literature/Letters
273099	Media and Communication Workers, All Other	56	10%	Communication, Journalism, and Related Programs
274021	Photographers	420	14%	Visual and Performing Arts
274031	Camera Operators, Television, Video, and Motion Picture	12	4%	Communications Technologies/Technicians and Support Services
274032	Film and Video Editors	53	16%	Communications Technologies/Technicians and Support Services
131011	Agents and Business Managers of Artists, Performers	7	4%	Visual and Performing Arts
272011	Actors	77	10%	Visual and Performing Arts
272012	Producers and Directors	214	9%	Visual and Performing Arts
272041	Music Directors and Composers	58	8%	Visual and Performing Arts
272042	Musicians and Singers	136	11%	Visual and Performing Arts

ARTS, AUDIO/VIDEO TECHNOLOGY & COMMUNICATIONS (CONTINUED)

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
272099	Entertainers and Performers, Sports and Related Workers, All	83	12%	Visual and Performing Arts
439081	Proofreaders and Copy Markers	23	6%	N/A*
271011	Art Directors	208	13%	Visual and Performing Arts
271013	Fine Artists, Including Painters, Sculptors, and Illustrator	26	4%	Visual and Performing Arts
271014	Multimedia Artists and Animators	92	9%	Visual and Performing Arts
271019	Artists and Related Workers, All Other	26	8%	Visual and Performing Arts
271021	Commercial and Industrial Designers	16	3%	Visual and Performing Arts
271023	Floral Designers	-98	-7%	N/A*
271024	Graphic Designers	664	10%	Visual and Performing Arts
271027	Set and Exhibit Designers	25	9%	Visual and Performing Arts
271029	Designers, All Other	-10	-6%	Visual and Performing Arts

XV. ARCHITECTURE & CONSTRUCTION

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Architecture & Construction	616	8.2%	
119021	Construction Managers	857	7%	Business, Management, Marketing, and Related Support Services
131051	Cost Estimators	158	9%	Engineering
171011	Architects, Except Landscape and Naval	47	4%	Architecture and Related Services*
171012	Landscape Architects	154	5%	Architecture and Related Services*
171022	Surveyors	969	10%	Engineering Technologies and Engineering-Related Fields*
172051	Civil Engineers	68	10%	Engineering
271025	Interior Designers	616	5%	Family and Consumer Sciences/Human Sciences

XVI. MANUFACTURING

SOC Code	Occupation Title	Projected Employment Change 2016-2026	Projected % Employment Change 2016-2026	Primary Corresponding Program
TOTAL	Manufacturing	-432	-3%	
131023	Purchasing Agents, Except Wholesale, Retail, and Farm Produce	-132	-1%	Business, Management, Marketing, and Related Support Services
519151	Photographic Process Workers and Processing Machine Operator	-300	-22%	N/A*