Academic Program Supply and Occupational Demand Projections: 2008–2018

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April 2011

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

The research presented in this report is a cooperative effort between the Tennessee Higher Education Commission and the University of Tennessee's Center for Business and Economic Research. Using historical data from 2000-2008 as a guide, we project academic awards for various instructional programs and disciplines for Tennessee's public, private for-profit and private non-profit post-secondary institutions through 2018. We link the academic award projections on the supply side of the labor market to anticipated job openings by occupation on the demand side of the labor market. The results provide insight into how well the output of Tennessee's educational institutions matches the anticipated demands of the state's employers. This information can be used by policymakers at all levels in Tennessee, from the legislative and executive branches down to the level of an academic award producing unit, as well as by business and city planners, guidance counselors and employers.

The instructional programs showing the largest projected increase in number of awards are in fields related to healthcare, business, education, and liberal arts. Our projections reflect the growing importance of the healthcare profession in our education system and economy, as seven of the top fifteen and fourteen of the top fifty fastest growing programs are in the healthcare profession. We also examine the top STEM (science, technology, engineering, and mathematics) programs and find that the number of graduates in eight of the top ten fastest growing STEM fields is expected to more than double by 2018; these fields are growing from a small base while demand is growing rapidly. Programs that are contracting the fastest include general business, management /computer information systems, administrative assistant and secretarial science, and journalism. Approximately 360 instructional programs at various award levels are projected to produce zero awards by 2018. In some cases, these programs are ending, but in many cases, programs are being reorganized.

Educational output is especially meaningful to the extent it meets the needs of private and public sector employers in Tennessee. Because many occupations do not require a highly specific educational award, we aggregate the data into functional groups–*career pathways*–and perform one-to-one matching of groups of academic programs with groups of occupations. The analysis of supply and demand within the pathways allows identification of gaps between projected educational awards and projected job openings. The largest under-supplied career pathways include programming and software development, marketing, human resources, business financial management and accounting, environmental service systems, and construction. The largest over-supplied career pathways include teaching, therapeutic services, science and mathematics, management, administrative and information support, and journalism. The estimated surplus of awards for teaching and therapeutic services is an artifact of the breadth of the career pathways and serves as a caution in interpreting and applying the data to policy. As noted in the report, more refined analyses of the markets for public elementary and secondary teachers and licensed practical nurses and registered nurses show significant shortfalls between projected award production and occupational demand.

Linking academic programs with specific occupations is very difficult for several reasons. First, the linkage between minimum educational requirements and specific occupations will likely be quite accurate for highly specialized awards, especially at the Associate's level and for many advanced degrees. However, many Bachelors' degree fields are more problematic because individuals have the opportunity to work across a range of occupations. Using aggregated career pathways to match sets of academic programs to a range of potential occupations is necessary but can mask underlying surpluses or deficits for specific award-occupation combinations.

Second, business and industry composition vary markedly across the state, and the production of post-secondary awards also varies across the state. Thus, demand for an occupation may be high relative to supply in one community while low

relative to supply in another community. Further, Tennessee does not obtain labor solely from within the state, and individuals with higher levels of educational attainment, especially Master's degrees and PhDs, are more likely to migrate in pursuit of employment opportunities elsewhere. Finally, our projections are based on historical data from 2000-2008; therefore, it is difficult to accurately project awards for newly-emerging fields and impossible to project awards for fields that have yet to be put in place.

Even with these limitations, the present study provides important information and serves notice that demand data will play an increasingly large role in academic program approval and termination, development of performance funding incentives for institutions, and student advising.

INTRODUCTION

Tennessee had a momentous year in 2010 with the receipt of a large federal Race to the Top grant and passage of several important education-related legislative initiatives. Especially notable was the Complete College Tennessee Act of 2010 which was signed into law by Governor Bredesen in January. While the state's public higher education institutions have historically been funded based largely on enrollment, the new outcomes-based funding formula will place greater emphasis on retention and graduation. The initiatives that Tennessee is embarking on offer the potential to fundamentally transform the state's educational pipeline to the betterment of state residents and the state economy.

Outcomes-based funding will place greater pressures on the institutional planning process. Resources will need to be carefully allocated to support growing instructional programs, especially those that reflect the strategic interests of the state and those that have strong employer demand. These decisions will have to be made in an extraordinarily difficult budget environment, and at least in the near term, in the face of weak state and national labor markets.

The research presented in this report is a cooperative effort between the Tennessee Higher Education Commission (THEC) and the University of Tennessee's Center for Business and Economic Research (CBER) and is intended to support the institutional planning process in Tennessee. The report includes projections of awards by instructional program extending out to 2018. Identified are awards and instructional programs that are expected to grow as well as those expected to contract based on historical trends between 2000 and 2008. These projections can be utilized by education policymakers at virtually all levels in Tennessee, from the legislative and executive branches down to the level of an academic award-producing unit.

Also presented in the report are projections of occupational demand between 2008 and 2018, as reflected by anticipated annual position openings by occupation. These estimates, developed by the Tennessee Department of Labor and Workforce Development, are linked to the projections of academic awards by career programs of study and are discussed more fully below. The occupational demand and academic award supply projections together can support the analysis of potential supply and demand imbalances anticipated in the years ahead. However, the projection process is complex, as is the changing environment within which Tennessee's institutions of higher education operate. As such, the projections presented here cannot be used in isolation but must take into account other information and trends that are occurring on both the supply and demand sides of the market.

The following section of the report discusses the methodology used to develop the supply and demand projections and important caveats that need to be considered when using the estimates. Subsequent sections present key findings, beginning with an overview of broad trends in projected awards and closing with an analysis of potential supply and demand imbalances. Appendices of the report provide documentation and a series of detailed tables that are intended to support the academic planning process. **Appendix 1** shows 2008 award production for Local Workforce Investment Area (LWIA) regions of the state. Detailed projections of awards by individual program of instruction appear in **Appendix 2**. **Appendix 3** presents the public and private shares of award production for 2008. These data can help shed light on the projections because all of forecasts of award supply are aggregated across public and private institutions of higher education. A significant number of award categories for specific instructional programs are projected to produce no graduates in 2018, and these are reported in **Appendix 4**. **Appendix 5** shows the share of graduates from Tennessee institutions of higher education that are working in the state three quarters after the receipt of a degree. These data can be used for a number of purposes, including the analysis of possible in-state imbalances between the supply of awards and the demand for workers across occupational categories. Data for **Appendix 5** were drawn from the series of

studies "School-to-Work: Do Tennessee's Higher Education Graduates Work in Tennessee?" (http://cber.bus.utk.edu/tnhe.htm). **Appendix 6** reports data on each of the career paths—the individual instructional programs contributing to supply and the individual occupations constituting the demand side of the market. Finally, **Appendix 7** presents information for High-Need Fields in support of the 2010–15 Performance Funding Cycle.

METHODOLOGY

Projections of academic award supply and occupational demand are developed independently and then linked together using *career clusters* and *career pathways*. The discussion below outlines the methodology used to develop the projections and highlights important caveats that need to be considered when using the data, especially in the context of examining possible imbalances between supply and demand.

Supply of Academic Awards

Postsecondary awards for individual instructional programs are projected to 2018. **Table 1** shows the various award levels produced by post-secondary institutions in Tennessee and used in this analysis. Concentrations and minors are not included because there is no way to directly link these awards to the minimum educational requirements of occupations on the demand side of the labor market. As discussed below, it is especially difficult to precisely match supply and demand at the bachelor's level. The reason is that a bachelor's degree in a field can support many possible occupations, while a given occupation may draw students from an array of different fields of study.

Table 1: Types of Awards

Awards of less than 1 academic year
Awards of at least 1 but less than 2 academic years
Associate degrees
Awards at least 2 but less than 4 academic years
Bachelor's degrees
Postbaccalaureate certificates
Masters degrees
Post-Masters certificates
Doctoral degrees
First-professional degrees
First-professional certificates

The Classification of Instructional Programs (CIP) for 2000 is used to categorize the fields of instruction. The supply projections account for all institutions in Tennessee that grant Associate's degrees or more advanced degrees, including all public, private non-profit and private for-

profit institutions that participate in the federal student financial aid program. Aggregate projections that encompass all post-secondary institutions are reported in this study including the appendix tables. **Table 2** provides a listing of the postsecondary institutions included in the analysis.

Data supporting the projections come from the federal Integrated Post-Secondary Education Data System (IPEDS). In analyzing the IPEDS data, it became apparent that the CIP definitions have not always been applied consistently by postsecondary institutions in Tennessee. One problem is that some schools define programs as "general" while other schools may designate a specific degree. A second problem is that some schools reported their data based on the 1990 CIP system for fields of study not present under the 2000 CIP taxonomy. CBER reassigned some data for years 2000–2003 using the national crosswalk between the 1990 and 2000 CIP system to address these issues.

The projections of award production by award level and instructional program are based on regression analysis and from historical data for 2000–2008. Historical trends in award production as reported in IPEDS and the resident population in the 20 to 29 age group provide the foundation for the regression analysis. The 20 to 29 age group was chosen because it represents the primary age cohort for college students and corresponds to an age classification used in the most recent statewide population projections developed by CBER. The projection of the historical trend, along with CBER's population projection for the 20 to 29 age group, enables the long-term forecast of individual awards by CIP to 2018.

The historical awards trend proved to have a greater impact on the supply projections than population demographics, which explained only a small share of the variance. As a result, if the number of awards showed historical growth between 2000 and 2008, it is likely that the projections produced a continuation of this growth trend. (In practice there may be some exceptions based on the up-and-down pattern of award granting for individual years in the 2000-2008 time window.) On the other hand, if the number

Table 2: Institutions Included in Analysis

Tennessee Board of Regents, 2-Year Community Colleges
    Chattanooga State Community College
    Cleveland State Community College
    Columbia State Community College
    Dyersburg State Community College
    Jackson State Community College
    Motlow State Community College
    Nashville State Community College
    Northeast State Community College
    Pellissippi State Community College
    Roane State Community College
    Southwest Tennessee Community College
    Volunteer State Community College
    Walters State Community College

Tennessee Board of Regents, 4-Year Universities
    Austin Peay State University
    East Tennessee State University
    Middle Tennessee State University
    Tennessee State University
    Tennessee Technological University
    University of Memphis

The University of Tennessee System
    The University of Tennessee
    The University of Tennessee Health Science Center
    The University of Tennessee-Chattanooga
    The University of Tennessee-Martin

Tennessee Independent Colleges & Universities Association
    Aquinas College
    Baptist Memorial College of Health Sciences
    Belmont University
    Bethel College
    Bryan College
    Carson-Newman College
    Christian Brothers University
    Cumberland University
    Fisk University
    Free Will Baptist Bible College
    Freed-Hardeman University
    Johnson Bible College
    King College
    Lambuth University
    Lane College
    Le Moyne-Owen College
    Lee University
    Lincoln Memorial University
    Lipscomb University
    Martin Methodist College
    Maryville College
    Meharry Medical College
    Memphis College of Art
    Middle Tennessee School of Anesthesia
    Milligan College
    Rhodes College
    Southern Adventist University
    Southern College of Optometry
    Tennessee Wesleyan College
    Trevecca Nazarene University

Tennessee Independent Colleges & Universities Association (cont'd)
    Tusculum College
    Union University
    University of the South
    Vanderbilt University
    Watkins Institute College of Art and Design

Private Institutions
    American Baptist College
    Argosy University-Nashville
    Church of God Theological Seminary
    Concorde Career Institute
    Crichton College / Victory University
    DeVry University-Tennessee
    Draughons Junior College / Daymar Institute-Clarksville
    Draughons Junior College / Daymar Institute-Murfreesboro
    Draughons Junior College / Daymar Institute-Nashville
    Electronic Computer Programming College Inc.
    Emmanuel School of Religion
    Harding University Graduate School of Religion
    High-Tech Institute-Memphis
    High-Tech Institute-Nashville
    Hiwassee College
    International Academy of Design and Technology
    ITT Technical Institute-Chattanooga
    ITT Technical Institute-Cordova
    ITT Technical Institute-Knoxville
    ITT Technical Institute-Nashville
    John A. Gupton College
    MedVance Institute-Cookeville
    MedVance Institute-Nashville
    Memphis Theological Seminary
    Miller-Motte Technical College-Chattanooga
    Miller-Motte Technical College-Clarksville
    Miller-Motte Technical College-Goodlettsville
    Nashville Auto Diesel College Inc.
    National College of Business and Technology-Nashville
    North Central Institute
    Nossi College of Art
    O'More College of Design
    Remington College
    Richmont Graduate University
    South College
    Southeast College of Technology
    Southeastern Paralegal Institute
    Temple Baptist Seminary
    Tennessee Institute of Electronics / Fountainhead
        Institute of Technology
    Tennessee Temple University
    The Art Institute of Tennessee-Nashville
    University of Phoenix-Chattanooga Campus
    University of Phoenix-Memphis Campus
    University of Phoenix-Nashville Campus
    Vatterott College-Memphis
    Virginia College-School of Business and Health
    Visible School-Music and Worships Arts College
    West Tennessee Business College
    William Moore College of Technology
    Williamson Christian College

of awards in an instructional program declined between 2000 and 2008, the projections typically produced a continuation of this trend. (Again, there may be exceptions based on the historical year-by-year pattern of award production.) For a number of awards/instructional programs, the supply projections went to zero, indicating the absence of award production.

As valuable as regression analysis is in providing a foundation for forecasting, it cannot account for any significant changes in the pattern of award granting or demographics not captured in the historical data. For example, it is difficult to accurately project awards for newly-emerging fields and impossible to project awards for fields of study that have yet to be put in place. Similarly, if students experience a significant shift in interest for a program of study in the years ahead, this will not be reflected in the supply forecast. Historical patterns of award production may also reflect the reallocation of resources that may have caused award numbers to shrink or expand. For example, a new program of study might have been introduced in 2000 with enrollment capped in 2008. In such a case, the supply projections would assume a continuation of enrollment growth because there is no way to deal with the enrollment cap. Factors like this need to be taken into account when using the projections contained in this report.

Occupational Demand Projections

Projections of employer demand for occupational categories delineated under the standard occupational classification (SOC) system begin with industry-level employment forecasts extending to 2018. Industry data are categorized using the North American Industrial Classification (NAIC) system. Industry employment forecasts were developed using the Annual Tennessee Econometric Model (ATEM) maintained by CBER. In support of this project, CBER created employment projections at a more disaggregated level of industry detail than is typically produced as a part of the annual forecasting cycle reported in the *Economic Report to the Governor of the State of Tennessee* (http://cber.bus.utk.edu/tefslist.htm). None of the more highly-aggregated estimates previously reported by CBER were altered through this re-estimation process.

The employment forecasts developed by CBER were provided to the Tennessee Department of Labor and Workforce Development (DLWD). The DLWD undertook an independent projection of employment by industry using the CBER projections as reference points. The DLWD forecasts were then run through a NAIC-to-SOC crosswalk matrix that has been developed specifically for Tennessee (based on a number of data sources, including in-state employer surveys). The demand-side crosswalk maps the projections of employment by industry to specific occupational categories and their *minimum* educational and training requirements.

To understand this step it is important to recognize that a business in any given industry can be expected to employ workers across an array of occupational categories. For example, a manufacturing firm will typically employ relatively large numbers of production workers with a range of formal education and training, as well as on-the-job training. The same firm will also employ workers in other occupational categories, such as engineers, computer and information systems managers, human resource managers and operation managers. The NAIC-to-SOC crosswalk is the tool used to translate industry *employment* projections to various *occupational* categories using actual patterns of occupational employment and educational attainment and training in Tennessee.

Industries are characterized by employment growth through new business starts and firm expansion as well as employment decline through firm contraction and business closure. The employment projections by industry are intended to capture the net influence of these dynamics on the *number of jobs* in the state economy. However, employer demand and annual position openings will also be affected by workplace dynamics like worker promotions and various forms of separation, such as quits, deaths, and retirements.

The historical awards trend proved to have a greater impact on the supply projections than population demographics, which explained only a small share of the variance.

For example, if a worker retires from her job and the job is filled by a recent college graduate, there is no change in the number of jobs in the economy. But the position opening created a job opportunity for the college graduate. The modeling work of the DLWD translates employment into occupational demand and *annual position openings* and accounts for this type of workplace dynamic.

Because of the presence of worker transitions, the annual number of replacements needed within an occupational category in a given year generally will not match the change in employment. The level of employment in an industry and the number of worker positions in an occupational category (for example, the number of engineering manager positions) might be static and show little or no change from year to year. However, worker separations will give rise to the need to find replacements even if there is no change in the overall level of employment and the number of occupational positions as with the example above. Even industries and occupations showing a net downward trend in employment and occupational positions may need to hire replacement workers on an annual basis due to separations. An example is engineering managers. The number of occupational positions in this SOC category is expected to fall from 3,156 to 3,023 between 2008 and 2018 in Tennessee. However, average openings for this occupation are expected to tally 64 per year.

The linkage between minimum educational requirements and specific occupations will likely be quite accurate for highly specialized awards, especially at the Associate's level and for many advanced degrees. On the other hand, many Bachelors' degree fields will be more problematic because individuals will have the opportunity to work across a range of occupations.

Associated with each occupational category in the SOC system is a minimum training or educational requirement as shown in **Table 3**. In practice, many occupations will require additional forms of training and education along with other specific skill sets. The minimum educational and training requirements in the SOC system are based on what is *typically observed* for a given occupational category in the economy. There certainly will be exceptions to these minimum requirements within business establishments, and they will likely change over time. For example, the prevailing minimum requirement for an occupation might be a Master's degree, but someone with a Bachelor's degree might be eligible for the position by virtue of accruing on-the-job training and having access to a firm's internal job ladder. Further, individuals with higher levels of training and educational attainment will potentially qualify for the job. For example, an occupation with a typically-observed minimum requirement of a Bachelor's degree would conceivably be open to a person with a Master's degree or a PhD.

The linkage between minimum educational requirements and specific occupations will likely be quite accurate for highly specialized awards, especially at the Associate's level and for many advanced degrees. On the other hand, many Bachelors' degree fields will be more problematic because individuals will have the opportunity to work across a range of occupations. The methodology used here reflects the prevailing pattern of occupations and educational requirements for individuals in Tennessee, and there will be exceptions to this prevailing pattern in practice.

Table 3: Types of Education Experience Requirements

First professional degree
Doctoral degree
Master's degree
Bachelor's or higher degree, plus work experience
Bachelor's degree
Associate degree
Postsecondary vocational training
Work experience in a related occupation
Long-term on -the-job training
Moderate-term on -the-job training
Short-term on -the-job training

Analyzing Supply and Demand

Instructional programs are linked to occupations using a CIP-to-SOC crosswalk that considers award levels and the prevailing pattern of educational awards for workers in different occupations. Employment is linked to occupations through the NAICS-to-SOC crosswalk. A practical problem with linkages between supply and demand at a highly disaggregated level is the absence of a one-to-one mapping between instructional awards and occupations. For example, a given instructional program may supply multiple occupations yielding a "one-to-many" assignment. It is also the case that multiple instructional awards may supply multiple occupations producing a "many-to-many" assignment. Focusing on disaggregated data that produce a one-to-many or many-to-many assignment produces too much ambiguity to be of use for most planning purposes.

Therefore, the approach taken in this report is to make assignments between groups of instructional awards and occupational groupings that produce a one-to-one matching. A problem with this approach is the inability to match specific awards with specific occupations—but as noted immediately above, this is generally not possible regardless of methodological approach. The one-to-one matching between groups of instructional programs and groups of occupations is achieved by using the Perkins IV Crosswalk. This linkage mechanism ties together career

> *The one-to-one matching between groups of instructional programs and groups of occupations is achieved by using the Perkins IV Crosswalk. This linkage mechanism ties together career clusters and career pathways on the supply side of the market and the SOC system on the demand side of the market.*

> *The state-level orientation of the projections needs to be taken into account when analyzing potential supply and demand imbalances. The demand analysis is built around statewide employer needs in Tennessee while the supply analysis focuses on the production of awards and degrees from public and private post-secondary institutions in the state.*

clusters and career pathways on the supply side of the market and the SOC system on the demand side of the market. The 16 career clusters in the Perkins model are shown in **Table 4** while **Table 5** shows the breakdown of the more specific career pathways that are present in Tennessee. It is important to emphasize the focus on *career pathways,* which may take students through a series of instructional programs and award levels to prepare themselves for a career and employment. As described in the documentation for the Perkins IV Crosswalk:

"*This…might be more convenient to use for planning and administrative purposes, when both instructional programs and occupations need to be considered and where double-counting of students or the jobs that they employ is concern. One potential application is the prioritization of programs of study and/or technical skill assessment development according to which clusters or pathways have more students, lead to more jobs or lead to jobs that are high skill, high wage or high demand*."

The state-level orientation of the projections needs to be taken into account when analyzing potential supply and demand imbalances. The demand analysis is built around statewide

employer needs in Tennessee while the supply analysis focuses on the production of awards and degrees from public and private post-secondary institutions in the state. Business and industry composition, and thus occupational patterns, vary markedly across the state, while the production of post-secondary awards also varies across the state. This means that the demand for an occupation may be high relative to supply in one community while low relative to supply in another community.

Another implication of the statewide focus is that it does not account for employer needs at the broader regional, national and international levels. Graduates of post-secondary institutions in Tennessee commonly migrate outside the state in pursuit of jobs. Paralleling this phenomenon on the supply side of the labor market is the in-migration of individuals from other states and countries who seek employment opportunities in Tennessee. Worker mobility is less important within occupational categories requiring low or modest levels of training and education because individuals with such traits tend to be less mobile and typically can be found in local labor markets. Mobility is more problematic for occupations requiring higher levels of educational attainment because the demand for these occupations may be national or international in scope. As a result, individuals with higher levels of educational attainment—especially Master's degrees and PhDs—are more likely to migrate in pursuit of employment opportunities elsewhere.

Worker mobility is more problematic for occupations requiring higher levels of education, as highly educated individuals are more likely to migrate in pursuit of employment opportunities.

Table 4: Career Clusters and Cluster Definitions

CLUSTER	TITLE	DESCRIPTION
1	Agriculture, Food and Natural Resource Cluster	The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fuel, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.
2	Architecture and Construction Cluster	Careers in designing, planning, managing, building and maintaining the built environment.
3	Arts, Audio/Video Technology and Communications Cluster	Designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services.
4	Business, Management and Administration Cluster	Business Management and Administration careers encompass planning, organizing, directing and evaluating business functions essential to efficient and productive business operations. Business Management and Administration career opportunities are available in every sector of the economy.
5	Education and Training Cluster	Planning, managing and providing education and training services, and related learning support services.
6	Finance Cluster	Planning, services for financial and investment planning, banking, insurance, and business financial management.
7	Government and Public Administration Cluster	Executing governmental functions to include Governance; National Security; Foreign Service; Planning; Revenue and Taxation; Regulation; and Management and Administration at the local, state, and federal levels.
8	Health Science Cluster	Planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.
9	Hospitality and Tourism Cluster	Hospitality & Tourism encompasses the management, marketing and operations of restaurants and other foodservices, lodging, attractions, recreation events and travel related services.
10	Human Service Cluster	Preparing individuals for employment in career pathways that relate to families and human needs.
11	Information Technology Cluster	Building Linkages in IT Occupations Framework: For Entry Level, Technical, and Professional Careers Related to the Design, Development, Support and Management of Hardware, Software, Multimedia, and Systems Integration Services.
12	Law, Public Safety, Corrections and Security Cluster	Planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services.
13	Manufacturing Career Cluster	Planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering.
14	Marketing Sales and Service Cluster	Planning, managing, and performing marketing activities to reach organizational objectives.
15	Science, Technology, Engineering and Mathematics Cluster	Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.
16	Transportation, Distribution, and Logistics Cluster	Planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

Source: States' Career Clusters Initiative, "The 16 Career Clusters," <http://careerclusters.org/16clusters.cfm>.

Table 5: Career Paths and Their Presence in Tennessee

Career Path Code	Career Path	TN Supply?
1.1	Food Products and Processing Systems Pathway	Y
1.2	Plant Systems Pathway	Y
1.3	Animal Systems Pathway	Y
1.4	Power Structural and Technical Systems Pathway	
1.5	Natural Resources Systems Pathway	Y
1.6	Environmental Service Systems Pathway	Y
1.7	Agribusiness Systems Pathway	
2.1	Design/Pre-Construction Pathway	Y
2.2	Construction Pathway	Y
2.3	Maintenance/Operations Pathway	Y
3.1	Audio and Video Technology and Film Pathway	Y
3.2	Printing Technology Pathway	Y
3.3	Visual Arts Pathway	Y
3.4	Performing Arts Pathway	Y
3.5	Journalism and Broadcasting Pathway	Y
3.6	Telecommunications Pathway	Y
4.1	Management Pathway	Y
4.2	Business Financial Management and Accounting Pathway	Y
4.3	Human Resources Pathway	Y
4.4	Business Analysis Pathway	Y
4.5	Marketing	Y
4.6	Administrative and Information Support Pathway	Y
5.1	Administrative and Information Support Pathway	Y
5.2	Professional Support Services Pathway	Y
5.3	Teaching/Training Pathway	Y
6.1	Financial and Investment Planning Pathway	Y
6.2	Business Financial Management Pathway	Y
6.3	Banking and Related Services Pathway	Y
6.4	Insurance Services Pathway	Y
7.1	Governance Pathway	Y
7.2	National Security Pathway	
7.3	Foreign Service Pathway	Y
7.4	Planning Pathway	Y
7.5	Revenue and Taxation Pathway	
7.6	Regulation Pathway	
7.7	Public Management and Administration Pathway	Y
8.1	Therapeutic Services Pathway	Y
8.2	Diagnostic Services Pathway	Y
8.3	Health Informatics Pathway	Y
8.4	Support Services Pathway	Y
8.5	Biotechnology Research and Development	Y
9.1	Restaurants and Food/Beverage Services Pathway	Y
9.2	Lodging Pathway	Y
9.3	Travel and Tourism Pathway	Y
9.4	Recreation, Amusements and Attractions Pathway	
10.1	Early Childhood Development and Services Pathway	Y
10.2	Counseling and Mental Health Services Pathway	Y
10.3	Family and Community Services Pathway	Y
10.4	Personal Care Services Pathway	Y
10.5	Consumer Services Pathway	Y
11.1	Network Systems Pathway	Y

Table 5: Career Paths and Their Presence in Tennessee (continued)

Career Path Code	Career Path	TN Supply?
11.2	Information Support and Services Pathway	Y
11.3	Interactive Media Pathway	Y
11.4	Programming and Software Development Pathway	Y
12.1	Correction Services Pathway	Y
12.2	Emergency and Fire Management Services Pathway	Y
12.3	Security and Protective Services Pathway	Y
12.4	Law Enforcement Services Pathway	Y
12.5	Legal Services Pathway	Y
13.1	Production Pathway	Y
13.2	Manufacturing Production Process Development Pathway	Y
13.3	Maintenance, Installation and Repair Pathway	Y
13.4	Quality Assurance Pathway	Y
13.5	Logistics and Inventory Control	
13.6	Health, Safety and Environmental Assurance	
14.1	Management and Entrepreneurship Pathway	Y
14.2	Professional Sales and Marketing Pathway	Y
14.3	Buying and Merchandising Pathway	Y
14.4	Marketing Communications and Promotion Pathway	
14.5	Marketing Information Management and Research Pathway	
14.6	Distribution and Logistics Pathway	
14.7	E-Marketing Pathway	Y
15.1	Engineering and Technology Pathway	Y
15.2	Science and Mathematics Pathway	Y
16.1	Transportation Operations Pathway	Y
16.2	Logistics Planning and Management Services Pathway	
16.3	Warehousing and Distribution Center Operations Pathway	
16.4	Facility and Mobile Equipment Maintenance Pathway	Y
16.5	Transportation Systems/ Infrastructure Planning, Management, & Regulation Pathway	
16.6	Health, Safety and Environmental Management Pathway	
16.7	Sales and Service Pathway	

Note: Career paths are subsets of clusters.

Source: Perkins Collaborative Resource Network for Program and Data Quality. Table 7: Primary Occupation and CIP in Pathways Cluster-Pathway-SOC-CIP Crosswalk file <http://cte.ed.gov/accountability/crosswalks.cfm>.

SUPPLY PROJECTIONS

Regional Awards

Tennessee is rich in educational institutions with over 100 institutions spread across 13 different local workforce investment areas (LWIA). Institutions range from the large campuses of the UT system to much smaller community colleges serving the specialized needs of local communities. Many students (particularly students with graduate degrees) will ultimately leave the area following graduation. However, those students contribute to the local economy while in school and add to the area's attractiveness for local employers who can recruit those students who desire to stay in the local area. **Table 6** presents the total 2008 degree awards for each of the LWIAs (see also, **Figure 1**). Detail by type of award can be found in **Appendix 1**.

The Nashville area (LWIA 9) leads the state in awards, with area institutions granting more than 17,000 awards in 2008. Schools in the Memphis area (LWIA 13) granted approximately 9,000 awards, followed by Knox County institutions

(LWIA 3), which granted about 7,500 awards. Schools in LWIA 5 (Chattanooga area) granted 5,100 awards, followed by LWIA 11 in West Tennessee with about 4,100 awards granted. As **Appendix 1** illustrates, the regions differ dramatically on the mix of award types granted. In Knox County, almost 75 percent of all awards consisted of Bachelor's or Master's degrees. In contrast, in LWIA 10, about 90 percent of 656 degrees were either Associate's degrees (75 percent) or Bachelor's degrees (16 percent). In LWIA 13 (Memphis area), about 22 percent of the total awards granted in that area consisted of awards of less than one academic year, the highest percentage of such awards in the state.

Aggregate Awards

The following discussion presents the results for our supply projections. We begin our discussion with an aggregate picture of the total number of awards by type and by year. We present three

Table 6: Summary of 2008 Awards by Labor and Workforce Investment Area

LWIA	Counties	Total Awards	
		Number	Percentage of total
LWIA 1	Carter, Johnson, Sullivan, Unicoi, and Washington Counties	3,861	6.6
LWIA 2	Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock, Hawkins, Jefferson, Sevier and Union Counties	3,505	6.0
LWIA 3	Knox County	7,561	12.9
LWIA 4	Anderson, Blount, Campbell, Cumberland, Loudon, Monroe, Morgan, Roane and Scott Counties	982	1.7
LWIA 5	Bledsoe, Bradley, Hamilton, McMinn, Marion, Meigs, Polk, Rhea and Sequatchie counties	5,151	8.8
LWIA 6	Bedford, Coffee, Franklin, Grundy, Lincoln, Moore and Warren Counties	820	1.4
LWIA 7	Cannon, Clay, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, Van Buren and White Counties	2,379	4.1
LWIA 8	Cheatham, Dickson, Houston, Humphreys, Montgomery, Robertson, Stewart, Sumner and Williamson Counties	2,953	5.0
LWIA 9	Davidson, Rutherford, Trousdale, and Wilson Counties	17,365	29.6
LWIA 10	Giles, Hickman, Lawrence, Lewis, Marshall, Maury, Perry and Wayne Counties	656	1.1
LWIA 11	Benton, Carroll, Chester, Decatur, Hardeman, Hardin, Haywood, Henderson, Henry, McNairy, Madison, and Weakley Counties	4,108	7.0
LWIA 12	Crockett, Dyer, Gibson, Lake, Lauderdale, Obion and Tipton Counties	207	0.4
LWIA 13	Fayette and Shelby Counties	9,023	15.4
TOTAL		**58,571**	**100.0**

Figure 1: Summary of 2008 Awards by Labor Workforce Investment Area

LWIA 1
3,861 awards

LWIA 2
3,505 awards

LWIA 3
7,561 awards

LWIA 4
982 awards

LWIA 5
5,151 awards

LWIA 6
820 awards

LWIA 7
2,379 awards

LWIA 8
2,953 awards

LWIA 9
17,365 awards

LWIA 10
656 awards

LWIA 11
4,108 awards

LWIA 12
207 awards

LWIA 13
9,023 awards
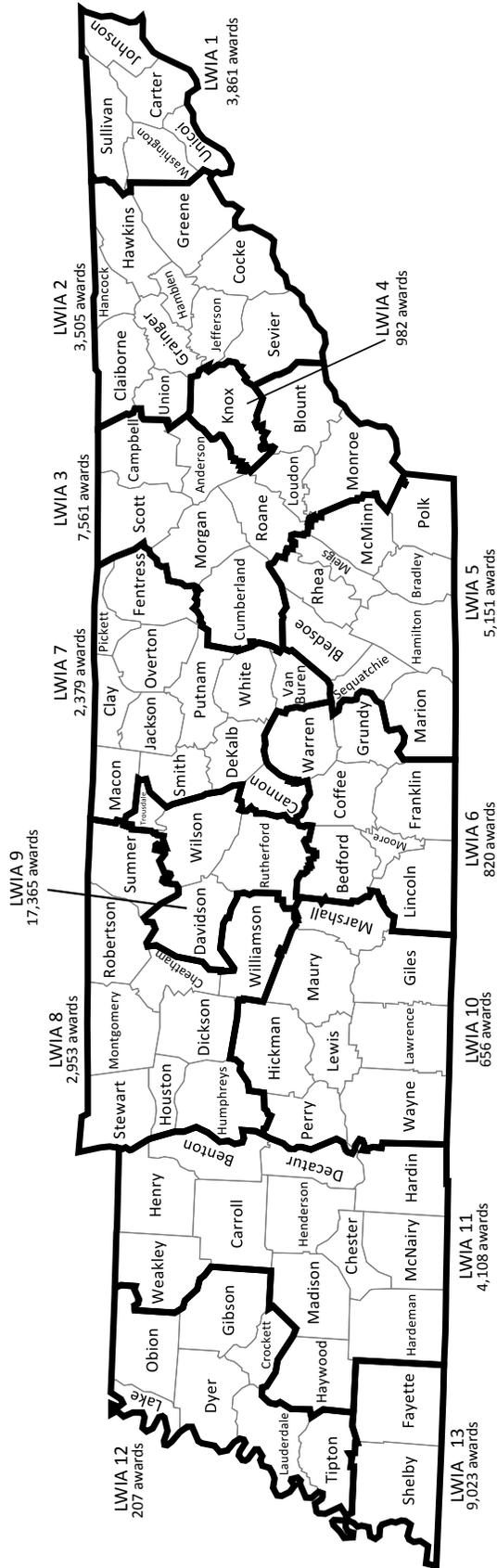
Note: Total awards, all areas: 58,571.

figures that show both the historical trend for the years 2000-2008 and our projections for 2009-2018. We then present supply projections by program using CIP codes at the two digit and six digit level, and also by award type.

Figure 2 presents projections for awards by year for the lowest levels of educational attainment required. Specifically, we look at awards that require less than one academic year, those that require at least one but less than two years, and finally awards that normally require at least two but less than four academic years.

The overall trend for the number of graduates with certificates awarded with less than one academic year, and awards requiring at least one but less than two academic years is very similar, both increasing by approximately 4,000 graduates between 2000 and 2018. Specifically, the number of graduates receiving certificates requiring less than one academic year is projected to be 5,500 in 2018 (left scale). Medical/Clinical assistant is the largest category of award of less than one academic year. The number of graduates receiving certificates requiring at least one but less than two academic years is projected to be 5,770 in

2018 (left scale). The certificates awarded in this category also include several related to healthcare and certificates awarded for specialized repair fields such as autobody/collision and repair and diesel mechanics technician. On the other hand the number of graduates with at least two but less than four academic years is projected to decline from 2000, with less than 100 certificates awarded in 2018 (right scale). However, note that the number of awards is similar to the number in 2008. This category contains very specialized degrees (e.g. pre-ministerial studies, bible/biblical studies, HVAC), with radiation therapists comprising over half of total graduates in this category by 2018.

Figure 3 reflects our projections for the number of Associate's, Bachelor's, Master's, and Doctoral degrees through 2018. In all four cases, we project an increase in the number of awards. We project the fastest growth for Associate's and Doctoral degrees over the next decade, increasing by 71 and 73 percent, respectively. Bachelor's degrees is the largest category of degree awards, and the number of graduates is projected to reach 39,700 by 2018, a 38 percent increase over the next decade. We also project 40 percent growth in Master's degrees,

Figure 2: Certificate Awards by Academic Year
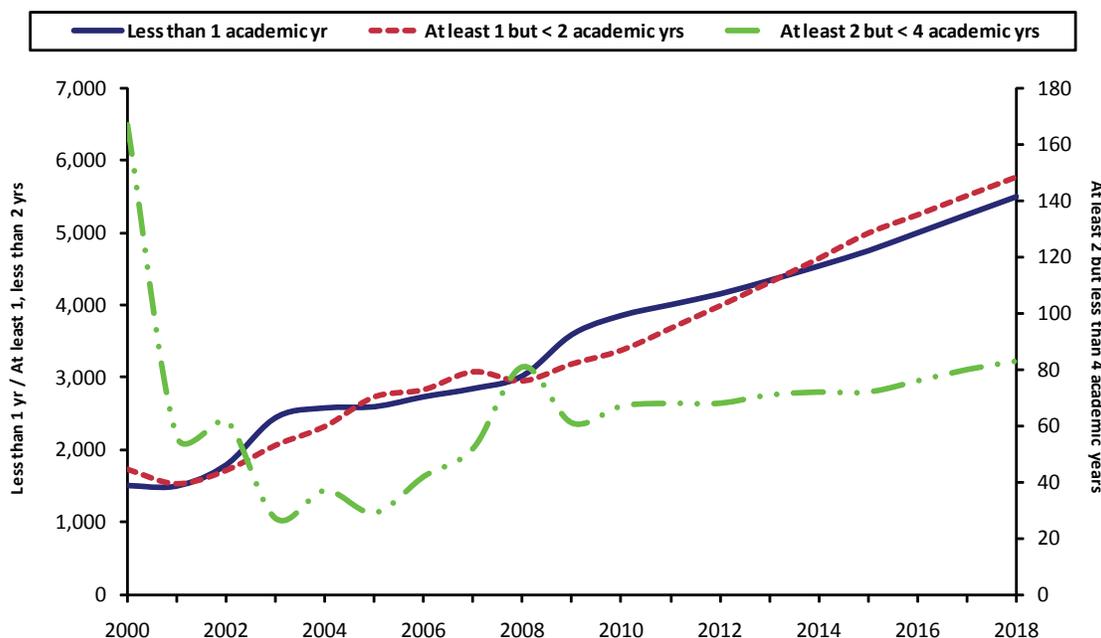
Figure 3: Degree Awards by Academic Year
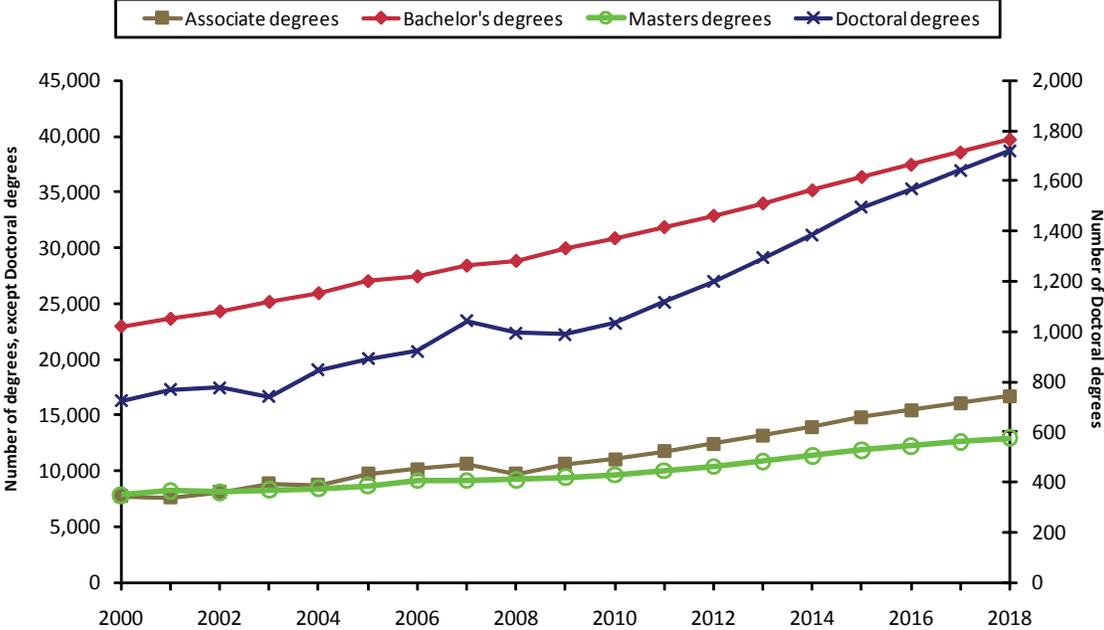
Figure 4: Post-BA, Post-MA, and First-Professional Awards by Academic Year
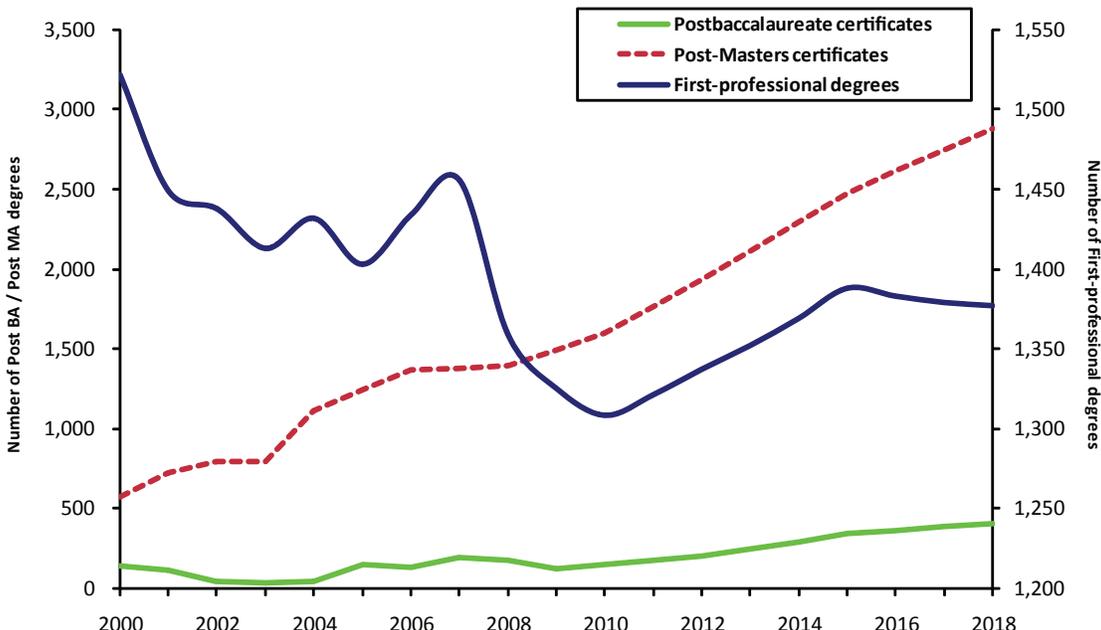
increasing from 9,200 awards in 2008 to 12,970 awards by 2018.

Figure 4 presents projections for post-baccalaureate, Post-Master's certificates and first-professional degrees. Post-baccalaureate and Post-Master's certificates are predominately granted in various teaching and education related categories. We project that the number of graduates with post-baccalaureate and Post-Master's certificates will more than double in the next decade. Specifically, we project that the number of graduates with post-baccalaureate certificates will increase from approximately 170 in 2008 to 400 by 2018. Further, we project that the number of graduates with Post-Master's certificates will increase from approximately 1,400 in 2008 to 3,000 by 2018.

First professional degrees include (in descending order of annual awards) law, medicine, pharmacy, divinity, optometry, dentistry, and veterinary medicine. The historical data for first-professional degrees reflect a slow decline in degrees from 2000 through 2007. Thus, we do not project a significant increase in the number in first-professional degrees. Our projections reflect that the number of students with first-professional degrees will slowly increase from 2010 to 2018, increasing from 1,321 degrees to 1,377 degrees in 2018.

Instructional Programs and Awards

The next series of tables reflects historical supply data and projections for individual programs using CIP codes. We begin with aggregated CIPs, but detailed projections for each CIP are located in **Appendix 2**. These data are for all Tennessee institutions, both public and private. Historical data on the share of awards granted by public versus private institutions are provided in **Appendix 3**.

The conclusions in the following tables should be of value for planning purposes and as a tool for resource allocation. Educational institutions and planners must consider projected increases in total

graduates for individual programs (e.g., accounting versus economics) but should also consider their broad attainment goals, e.g. Associate's degrees versus Bachelor's degrees, for growth in specific instructional programs. The goal is for the tables to allow an examination of future trends at the macro level of degree types as well as down to the departmental level to examine specific majors and the classes needed to fulfill major requirements. Because our supply forecast is based on historical trends, our projections assume that these broad trends will continue. However, we cannot project newly-emerging fields or fields that do not yet exist; thus, some caution is warranted when using these forecasts.

We first present the data using a 2-digit CIP code in **Table 7**. These 38 programs are listed in ascending CIP order and include awards at all levels of attainment. We present the number of graduates from 2000-2008, followed by our forecast for 2018. We also present the average number of graduates for the period from 2000-2008 and 2008-2018 to allow for smoothing of the endpoints. The final column is the difference in these two columns and reflects the change in number of graduates.

Nearly every program is projected to grow during the next decade when compared to the previous eight years. The health profession and related clinical sciences (CIP 51) is projected to add the largest number of graduates, growing from 11,124 graduates in 2008 to 21,559 by 2018. This increase of approximately 10,400 graduates is a 6.8 percent compounded annual growth rate. By 2018, the number of graduates in the health field will almost double the number of graduates in business, the next largest CIP. Graduates with a liberal arts degree (CIP 24) and graduates with an education degree (CIP 13) are also projected to grow quickly and to add a significant number of graduates by 2018. Specifically, the number of liberal arts graduates will increase by approximately 2,600 students, a 4.9 percent annual

The health profession and related clinical sciences (CIP 51) is projected to add the largest number of graduates, nearly doubling by 2018.

Table 7: Instructional Program Forecast, 2-Digit CIP Summary, Awards by Academic Year

CIP	Program	Number of Graduates Historical data									Forecast	Average Graduates		Growth 2000-08 to
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2018	2000-08	2008-18	2008-18
01	Agriculture, Agriculture Operations, & Related Sciences	441	472	445	455	418	441	454	414	428	570	441	497	56
03	Natural Resources & Conservation	217	171	172	172	157	179	153	142	139	108	167	124	-43
04	Architecture & Related Services	92	108	64	96	80	64	77	109	77	105	85	83	-2
05	Area, Ethnic, Cultural, & Gender Studies	93	84	108	125	139	171	102	129	133	196	120	170	50
09	Communication, Journalism, & Related Programs	1,001	1,090	1,219	1,439	1,360	1,555	1,442	1,543	1,487	2,383	1,348	1,980	632
10	Communications Technologies/Technicians & Support Services	2	1	1	0	67	47	48	51	105	186	36	141	105
11	Computer & Information Sciences & Support Services	752	816	1,149	1,344	1,234	1,261	1,151	1,123	1,097	1,933	1,103	1,599	496
12	Personal & Culinary Services	79	76	93	101	110	95	107	198	266	354	125	294	169
13	Education	4,941	5,242	5,060	5,552	5,798	6,255	6,688	6,707	6,485	10,635	5,859	8,518	2,659
14	Engineering	1,426	1,410	1,427	1,467	1,575	1,535	1,411	1,465	1,497	1,658	1,468	1,573	105
15	Engineering Technologies/Technicians	1,404	1,226	1,192	1,175	1,066	1,114	1,105	989	1,006	1,484	1,142	1,280	138
16	Foreign Languages, Literatures, & Linguistics	300	351	412	453	511	493	517	513	538	845	454	711	257
19	Family & Consumer Sciences/Human Sciences	685	713	805	994	982	957	957	956	928	1,357	886	1,192	306
22	Legal Professions & Studies	766	694	735	774	750	777	749	744	687	845	742	775	33
23	English Language & Literature/Letters.	1,022	1,048	1,051	977	1,042	1,125	1,132	1,084	1,052	1,317	1,059	1,171	112
24	Liberal Arts & Sciences, General Studies, & Humanities	2,882	2,981	3,108	3,363	3,407	4,039	4,145	4,370	4,319	6,936	3,624	5,587	1,963
25	Library Science	42	78	95	78	79	95	88	88	99	135	82	120	37
26	Biological & Biomedical Sciences	1,214	1,189	1,181	1,129	1,157	1,137	1,188	1,323	1,378	1,701	1,211	1,485	274
27	Mathematics & Statistics	294	343	339	362	396	368	384	356	318	419	351	384	33
30	Multi/Interdisciplinary Studies	1,422	1,360	1,328	1,179	1,236	1,309	1,491	1,639	1,710	2,190	1,408	1,834	426
31	Parks, Recreation, Leisure & Fitness Studies	816	811	922	823	858	919	962	1,003	1,021	1,321	904	1,150	246
32	Basic Skills	48	16	19	19	34	20	34	35	14	66	27	37	11
38	Philosophy & Religious Studies	261	287	355	304	400	351	424	357	376	545	346	474	128
39	Theology & Religious Vocations	742	782	782	800	753	841	735	887	808	1,138	792	943	150
40	Physical Sciences	480	465	457	457	434	449	502	586	570	729	489	623	134
41	Science Technologies/Technicians	218	260	178	187	157	250	213	155	152	169	197	154	-43
42	Psychology	1,698	1,831	1,894	1,992	2,064	2,055	2,064	2,092	2,090	2,646	1,976	2,404	429
43	Security & Protective Services	701	679	667	725	683	808	827	964	941	1,443	777	1,152	374
44	Public Administration & Social Service Professions	741	658	677	694	745	744	778	713	864	952	735	896	161
45	Social Sciences	1,802	1,827	2,004	2,146	2,148	2,083	2,258	2,143	2,265	2,660	2,075	2,531	456
46	Construction Trades	42	56	46	51	58	78	46	87	102	149	63	119	56
47	Mechanic & Repair Technologies/Technicians	1,416	1,163	1,161	1,388	1,536	1,623	1,805	1,619	1,506	2,541	1,469	2,056	588
48	Precision Production	54	49	44	41	20	38	40	32	40	53	40	43	4
49	Transportation & Materials Moving	54	54	73	88	113	104	150	158	127	315	102	222	120
50	Visual & Performing Arts	1,625	1,704	1,828	1,833	2,109	2,077	2,079	2,202	2,265	3,255	1,969	2,774	805
51	Health Professions & Related Clinical Sciences	6,089	6,005	6,454	7,349	8,081	9,071	10,265	11,300	11,124	21,559	8,415	16,095	7,679
52	Business, Management, Marketing, & Related Support Services	8,394	8,905	8,961	9,086	9,160	9,248	8,990	9,258	9,114	11,335	9,013	10,229	1,216
54	History (New)	590	579	592	592	565	669	665	684	683	883	624	770	146

growth rate. The number of graduates with an education degree will increase by approximately 4,150, a 5.1 percent annual growth rate. Finally, graduates with a degree in business, management, marketing or related business field (the second largest CIP by graduates) are projected to increase by approximately 2,200 students to 11,335, though with a slower annual growth rate of 2.2 percent.

Several CIPs remain significant sources of graduates but are not expected to experience much growth in the coming years. For example, Engineering (CIP 14) and Engineering Technologies Technicians (CIP 15) together had 2,500 graduates in 2008 but are expected to add only 500 graduates from 2008-2018. Likewise, psychology will produce approximately 2,600 graduates in 2018, only 556 higher than the number of graduates in 2008.

The next two tables—**Tables 8 and 9**—reflect historical data and projections by program using the 6 digit CIP code. We present results only for the top ten largest growing and declining CIPs. The full listing of programs by 6-digit CIP can be found in **Appendix 2**.

The top ten categories confirm in large part what was demonstrated in the previous table (see **Table 8**). The CIPs showing the largest expected

Seven out of the top fifteen and fourteen out of the top fifty fastest growing programs are in the healthcare profession.

increase in number of awards include healthcare, business, education, and liberal arts, which are also the largest CIP categories by number of graduates. Nursing-Registered Nurse Training (CIP 511601) will show the largest growth in number of graduates, and four of the top ten CIPs are in the healthcare profession. This is an impressive testament to the growing importance of the healthcare profession in our education system and economy, but the broader impact is even more impressive. Seven out of the top fifteen and fourteen out of the top fifty fastest growing CIPs are also in the healthcare profession.

As we discussed in the methodology section, the colleges and universities assign CIP codes to their graduates. The CIPs showing the largest expected decline in number of graduates (**Table 9**) are in some cases due to changes in classification. For example, although the CIP with the largest estimated decline is Business/Commerce, General (CIP 520101), a similar CIP (520201) is fourth on the list of top growing programs above (See **Table 8**). Similarly, although Education, General (CIP 130101) is showing a decline, education as a whole is expected to grow substantially through 2018. Those interested in the fields listed in **Table 9** are advised to review the appendix to see if equivalent or near

Table 8: Top 10 Growing CIPs

CIP	Program	STEM	Average Graduates Per Academic Year			Growth 2000-08 to
			2000–08	2008–18	2018	2008-18
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		2,251	4,532	5,983	2,280
240101	Liberal Arts and Sciences/Liberal Studies		3,317	5,179	6,317	1,862
510801	Medical/Clinical Assistant		948	2,483	3,420	1,535
520201	Business Administration and Management, General		4,092	5,718	6,392	1,625
130401	Educational Leadership and Administration, General		1,064	1,890	2,395	826
130499	Educational Administration and Supervision, Other		673	1,351	1,749	678
131202	Elementary Education and Teaching		555	995	1,300	440
510805	Pharmacy Technician/Assistant		196	593	840	397
131206	Teacher Education, Multiple Levels		242	617	819	375
510909	Surgical Technology/Technologist		174	515	718	340

equivalent CIPs exist and combine the results above with those equivalent CIPs to get a truer picture of estimated growth.

None of the top 10 STEM (science, technology, engineering, and math) categories appear in the list of fastest growing CIPs (see **Table 10**). As a general observation, the STEM fields are rapidly growing from a small base. The STEM CIP that is expected to add the most graduates is Computer Systems Networking and Telecommunications (CIP 110901) and ranks 20th among all CIPs. The number of graduates is expected to more than double, from 234 to 567 by 2018, but the small size prevents the CIP from appearing on the top ten list above. In fact, of the 10 fastest growing STEM CIPs, eight of them will more than double by 2018, including Web Page Design (CIP 110801), Engineering Technology (CIP 150000), Computer and Information Systems Security (CIP 111003).

We present historical and projected graduates for every CIP by award level in **Appendix 2**. The table is sorted first by award type and then by growth in number of graduates between 2000-2008 and 2008-2018, in descending order. The discussion that follows highlights some of the CIPs in each award type that are projected to show the largest increases in number of graduates.

Awards that require less than one academic year are granted in a wide variety of CIPs. Nine out of the top ten by growth in number of

> *As a general observation, the STEM fields are rapidly growing from a small base.*

graduates are in the healthcare profession and include Medical/Clinical Assistant, Emergency Medical Technology/Technician (EMT Paramedic), and Medical Insurance Specialist/Medical Biller. Other CIPs that project growth include a number of technical awards in areas such as Aircraft Powerplant Technician, Computer Programming, Landscaping and Groundskeeping, and Criminal Justice/Police Science.

The top ten CIPs for awards requiring at least one academic year but less than two show a similar pattern. Six of the top ten are in the healthcare field and include Medical/Clinical Assistant, Surgical Technology/Technologist, and Medical Office Assistant/Specialist. This category also includes a number of technology/technician awards in the top ten, such as Autobody/Collision and Repair, Alternative Fuel Vehicle, Diesel Mechanics, and Heating, Air Conditioning, Ventilation and Refrigeration.

Few awards require at least two but less than four academic years. Medical Radiologic Technology/Science – Radiation Therapist represents more than half of all awards in this

Table 9: Top 10 Slowest Growing *or* Declining CIPs

CIP	Program	STEM	Average Graduates Per Academic Year 2000–08	2008–18	2018	Decline in Average Annual Awards 2000-08 to 2008-18
520101	Business/Commerce, General		516	149	13	-367
521201	Management Information Systems, General		476	185	76	-291
110101	Computer and Information Sciences, General	Yes	293	129	67	-164
520401	Administrative Assistant and Secretarial Science, General		276	114	76	-162
090401	Journalism		216	89	0	-127
130101	Education, General		788	668	576	-121
500402	Commercial and Advertising Art		191	126	93	-66
450101	Social Sciences, General		228	198	137	-30
450601	Economics, General		411	382	286	-29
440701	Social Work		533	552	512	20

category, with only 57 awards expected by 2018.

For Associate's Degrees, the CIP showing the largest expected growth in number awards is Liberal Arts and Sciences/Liberal Studies, with a projected increase of approximately 1,200 degrees from 2000-08 to 2008-18. The second largest increase is expected in Nursing – Registered Nurse Training, with a projected growth of 742 awards. Six of the top ten are in the healthcare field. The two STEM awards in the top ten are Computer Systems Networking and Telecommunications, and Web Page, Digital/Multimedia & Information Resources Design.

Quite a bit of variety exists in the Bachelor's degree CIPs expected to show the largest increase in number of graduates. The CIP projected to increase most is Business Administration and Management, General which is projected to grow by 1,243 awards to 4,034 by 2018. Nursing – Registered Nurse Training is projected to grow by 1,101 awards to 3,109. Other CIPs in the top ten of this category include Liberal Arts and Sciences/Liberal Studies, Mass Communication/Media Studies, Music Management and Merchandising, and Teacher Education, Multiple Levels.

Few programs offer a Postbaccalaureate certificate. Elementary Education and Teaching is expected to grow by 89 awards to a total of 178 from 2000-08 to 2008-18, and Teacher Education, Multiple Levels is expected to grow by 12 awards over the same period. All other CIPs in this category project growth of less than 10 awards.

For Master's degrees, the CIPs with the largest projected growth are Education Leadership and Administration (increase of 334 degrees to 1,313 total awards by 2018), Nursing – Registered Nurse Training (increase of 312 degrees to 617 total)

Approximately 360 CIPs in various award types project to have zero awards by 2018.

and Business Administration and Management, General (increase of 297 degrees to 1,775 total). The top ten includes four CIPs in education and three CIPs in healthcare. Public Administration is tenth on the list.

Post-Master's certificates are awarded almost entirely in the education field. Educational Administration and Supervision (1,682 awards by 2018) and Educational Leadership and Administration, General (963 awards by 2018) represent over 90 percent of all Post-Master's certificate awards.

For Doctoral degrees, the CIP with the largest projected growth is Physical Therapy/Therapist, which is expected to grow by 126 awards to 276 total awards by 2018. This category is notable for the number of STEM CIPs (five) in the top ten, including Cell/Cellular and Molecular Biology, Materials Engineering, Biology/Biological Sciences, and Oncology and Cancer Biology. In fact, over thirty STEM CIPs project to increase the number of Doctoral degrees granted by 2018.

First-professional degrees are awarded in Pharmacy, Medicine, Veterinary Medicine, Optometry, Dentistry, Law, and Divinity. We project modest declines in the number of awards for Medicine, Divinity and Dentistry, with modest increases in awards for Pharmacy.

Approximately 360 CIPs in various award types project to have zero awards by 2018. Some programs are ending, but in many cases the CIP is simply being redefined or the category reorganized. **Table 11** reflects a summary by award level; refer to **Appendix 4** for a detailed list of the programs expected to produce zero graduates in 2018, sorted by level of award.

Table 10: Top STEM CIPs by Number of Awards

CIP	Program	Career Path	Average Graduates Per Academic Year		Average Annual Award Growth 2000-08 to 2008-18
			2000–08	2008–18	
110901	Computer Systems Networking and Telecommunications	11.1	129	423	294
110801	Web Page, Digital/Multimedia & Information Resources Design	11.1	54	254	200
260101	Biology/Biological Sciences, General	15.2	972	1,119	147
111003	Computer and Information Systems Security	11.4	35	171	136
151501	Engineering/Industrial Management	15.1	40	161	121
141301	Engineering Science	15.1	55	158	103
150000	Engineering Technology, General	15.1	189	288	98
150501	Heating, Air Conditioning & Refrigeration Technology/Technician (ACH/ACR/ACHR/HRAC/HVAC/AC Technology)	2.2	23	115	92
110103	Information Technology	11.2	100	177	76
151302	CAD/CADD Drafting and/or Design Technology/Technician	2.1	35	107	72

Table 11: Number of Programs Forecasted to Produce Zero Graduates in 2018

	Number of programs with zero graduates in 2018
CERTIFICATE AWARDS	
Awards of less than 1 academic year	43
Awards at least 1 but less than 2 academic years	24
Awards at least 2 but less than 4 academic years	7
Postbaccalaureate certificates	9
Post-Masters certificates	8
First-professional certificates	–
DEGREE AWARDS	
Associate degrees	64
Bachelor's degrees	107
Masters degrees	68
Doctoral degrees	32
First-professional degrees	–

See Appendix 5 for additional detail.

SUPPLY AND DEMAND ANALYSIS

The projections of academic awards are linked to the demand side of the labor market using career clusters and career pathways as described more fully in the methodology section. The linkages reported here represent one-to-one matchings of groups of awards and their instructional fields with groups of occupations. However, surpluses or deficits for the overall career pathway can mask underlying surpluses or deficits for specific award-occupation combinations. It is important to recognize that the career paths are routes prospective students may take to progress through different award levels to ultimately secure the academic credentials that are required to support employment in a specific occupation. One implication of the career pathway approach is that the granting of an individual award may not reflect a student's terminal point in the academic pipeline and immediate entry into the labor market.

Table 12 shows the 10 career pathways with the largest projected deficits as measured by discrepancies between annual position openings on the demand side of the market when compared against average annual awards granted on the supply side of the market. These figures do not account for any potential in-migration that might help fill the identified shortfalls. **Appendix 6** includes detail on the full range of career clusters and career pathways; **Appendix 7** provides additional information on "High-Need Fields" to support the 2010–15 Performance Funding Cycle. Because the supply-side projections only focus on awards beyond the Associate's level, the supply of lower level awards as well as job openings requiring lower level awards are omitted from the table. As shown, four of the career paths include some STEM designated award(s): Programming and Software Development, Environmental Service Systems, Construction, and Biotechnology Research and Development. Note that Environmental Service Systems is projected to produce an average of *zero* awards between 2008 and 2018. (See **Appendix 4** for a list of award categories expected to produce zero graduates in 2018, including many STEM designated fields.)

The Programming and Software Development pathway is projected to have the largest annual shortfall between annual award production and annual position openings (a deficit of 397 per year). The Business Financial Management and

Table 12: Top 10 Under-Supplied Paths

Career Path		STEM	Average Graduates Per Academic Year[1]		Average Openings[2]	Average Annual Graduate	Supply to Demand
			2000–08	2008–18	2008–18	Deficit	Ratio
11.4	Programming and Software Development Pathway	Yes	131	281	678	-397	0.41
4.5	Marketing		9	37	397	-360	0.09
4.3	Human Resources Pathway		73	140	447	-307	0.31
4.2	Business Financial Management and Accounting Pathway		1,319	1,192	1,376	-184	0.87
1.6	Environmental Service Systems Pathway	Yes	7	0	149	-149	–
2.2	Construction Pathway	Yes	19	88	200	-112	0.44
12.1	Correction Services Pathway		14	24	104	-80	0.23
6.2	Business Financial Management Pathway		2	1	79	-78	0.01
4.6	Administrative and Information Support Pathway		183	113	181	-68	0.62
8.5	Biotechnology Research and Development	Yes	8	23	70	-48	0.32

1. Award levels less than an associate's degree are excluded.

2. Job openings with educational requirements lower than an associate's degree are excluded.

Accounting pathway will produce the largest number of annual awards of any of the career pathways shown in **Table 13** (1,192 per year), but will still yield an annual shortfall of 184 due to strong employer demand.

The Environmental Service Systems pathway is projected to produce no awards between 2008 and 2018, a reflection of a decline in historical award production between 2000 and 2008. However, businesses in Tennessee can be expected to hire an average of 149 workers in this field over the same time period. Shortfalls such as this will need to be filled through other means, including the recruitment of award recipients from outside Tennessee. The Business Financial Management pathway is expected to produce only one award per year while Tennessee employers will need to hire 79 workers a year producing an annual deficit of 78 positions.

The 10 career pathways anticipated to have the largest average annual surpluses of award recipients are shown in **Table 13**. Two of the pathways— Science and Mathematics and Engineering and Technology—include some STEM designated award(s). The surpluses shown in the table could reflect the fact that the analysis is focused on career pathways that include awards that do not take an individual directly to a career. It is also the case that the demand side of the market in Tennessee simply does not yield a large number of average annual openings for these fields. In other words, if the state had more employers requiring workers with STEM credentials, the shortfall would be smaller or could conceivably vanish. To the extent that supply does exceed demand, one would expect award recipients to seek employment outside the state of Tennessee.

Like **Table 12**, awards below an Associate's degree and occupations requiring awards or training below an Associate's degree are omitted from the data. Surprisingly, the Teaching/Training pathway shows a large annual average surplus in awards relative to demand. There are two primary explanations for this seemingly anomalous finding. First, the analysis here considers award production from Tennessee institutions of higher education. In practice many of these award recipients will choose to work outside the state, others will work in fields outside education and some will simply not work at all. (**Appendix 5** provides information by academic field on the share of graduates who are working in Tennessee in some job three quarters after the receipt of a degree.) Second, a large share of the awards are at the Associate's level and do not reflect individuals with the credentials to enter the classroom as a regular teacher (see the detailed data on Teaching/Training pathway 5.3 in **Appendix 6**). For a detailed and focused analysis

Table 13: Top 10 Over-Supplied Paths

Career Path		STEM	Average Graduates Per Academic Year[1]		Average Openings[2] 2008–18	Average Annual Graduate Surplus	Supply to Demand Ratio
			2000–08	2008–18			
5.3	Teaching/Training Pathway		8,934	12,499	3,407	9,092	3.67
8.1	Therapeutic Services Pathway		6,637	10,809	3,143	7,666	3.44
15.2	Science and Mathematics Pathway	Yes	4,739	5,827	300	5,527	19.42
4.1	Management Pathway		5,230	6,532	1,882	4,650	3.47
5.1	Administrative and Information Support Pathway		1,950	3,651	371	3,280	9.84
3.5	Journalism and Broadcasting Pathway		1,201	1,829	144	1,685	12.70
3.4	Performing Arts Pathway		1,091	1,549	213	1,336	7.27
15.1	Engineering and Technology Pathway	Yes	1,636	1,929	608	1,321	3.17
7.1	Governance Pathway		751	1,275	94	1,181	13.56
10.2	Counseling and Mental Health Services Pathway		1,300	1,762	723	1,039	2.44

1. Award levels less than an associate's degree are excluded.

2. Job openings with educational requirements lower than an associate's degree are excluded.

of teacher supply and demand in Tennessee, see *Supply and Demand for Teachers in Tennessee*, http://cber.bus.utk.edu/pubs/bfox269.pdf.

The Therapeutic Services pathway (8.1) also yields a large implied surplus with average annual openings of 3,143 compared to average annual graduate production of 10,809. The surplus—7,666 per year—places this pathway in second place for an overage in Table 13. However, on face value these findings appear to be inconsistent with a 2009 report "Forecasting Supply, Demand, and Shortage of Nurses in Tennessee" that identified significant shortfalls in supply relative to demand by 2020 (http://www.centerfornursing. org/research/Forecasting%20Supply%20%20 Demand%20in%20TN%20June%2025%202009. pdf). The reason is that the 2009 study considered only licensed registered nurses and practical nurses, while the Therapeutic Services pathway includes a much wider range of study areas on the supply side of the market than simply nursing. For example, pathway 8.1 includes general psychology (with annual bachelor's degree production of 1,827), dental assistants (586 awards per year), pharmacy technicians (593 awards per year) and first-professional degree pharmacists (126 per year).

The other career pathways all produce large surpluses. In some instances these surpluses are likely to be real, while in other instances they may simply reveal issues like those that surface in the context of the teaching/training pathway. For example, individuals will migrate to pursue employment options elsewhere or simply choose not to work.

APPENDICES

APPENDIX 1: NUMBER OF AWARDS OF PUBLIC AND PRIVATE INSTITUTIONS BY LOCAL WORKFORCE INVESTMENT AREA, 2008

Level of Award	Number of Awards in Academic Year 2008	2008 Awards as a Percentage of	
		LWIA	Total
LWIA 1: Carter, Johnson, Sullivan, Unicoi, and Washington Counties			
. Awards of less than 1 academic year	28	0.7	0.0
Awards at least 1 but less than 2 academic years	146	3.8	0.2
Postbaccalaureate certificates	12	0.3	0.0
Post-Masters certificates	4	0.1	0.0
Associate degrees	546	14.1	0.8
Bachelor's degrees	2,279	59.0	3.4
Masters degrees	719	18.6	1.1
Doctoral and First-professional degrees	127	3.3	0.2
LWIA 2: Claiborne, Cocke, Grainger, Greene, Hamblen, Hancock, Hawkins, Jefferson, Sevier and Union Counties			
Awards of less than 1 academic year	271	7.7	0.4
Awards at least 1 but less than 2 academic years	23	0.7	0.0
Post-Masters certificates	879	25.1	1.3
Associate degrees	761	21.7	1.1
Bachelor's degrees	1,142	32.6	1.7
Masters degrees	429	12.2	0.6
LWIA 3: Knox County			
Awards of less than 1 academic year	33	0.4	0.0
Awards at least 1 but less than 2 academic years	10	0.1	0.0
Postbaccalaureate certificates	60	0.8	0.1
Associate degrees	944	12.5	1.4
Bachelor's degrees	3,995	52.8	5.9
Masters degrees	1,607	21.3	2.4
Doctoral and First-professional degrees	912	12.1	1.3
LWIA 4: Anderson, Blount, Campbell, Cumberland, Loudon, Monroe, Morgan, Roane and Scott Counties			
Awards of less than 1 academic year	78	7.9	0.1
Awards at least 1 but less than 2 academic years	28	2.9	0.0
Associate degrees	656	66.8	1.0
Bachelor's degrees	220	22.4	0.3
LWIA 5: Bledsoe, Bradley, Hamilton, McMinn, Marion, Meigs, Polk, Rhea and Sequatchie counties			
Awards of less than 1 academic year	118	2.3	0.2
Awards at least 1 but less than 2 academic years	268	5.2	0.4
Awards at least 2 but less than 4 academic years	8	0.2	0.0
Post-Masters certificates	10	0.2	0.0
Associate degrees	1,164	22.6	1.7
Bachelor's degrees	2,761	53.6	4.1
Masters degrees	784	15.2	1.2
Doctoral and First-professional degrees	38	0.7	0.1

Level of Award	Number of Awards in Academic Year 2008	2008 Awards as a Percentage of	
		LWIA	Total
LWIA 6: Bedford, Coffee, Franklin, Grundy, Lincoln, Moore and Warren Counties			
Postbaccalaureate certificates	1	0.1	0.0
First-professional certificates	2	0.2	0.0
Associate degrees	404	49.3	0.6
Bachelor's degrees	377	46.0	0.6
Masters degrees	3	0.4	0.0
Doctoral and First-professional degrees	33	4.0	0.0
LWIA 7: Cannon, Clay, DeKalb, Fentress, Jackson, Macon, Overton, Pickett, Putnam, Smith, Van Buren and White Counties			
Awards at least 1 but less than 2 academic years	164	6.9	0.2
Awards at least 2 but less than 4 academic years	23	1.0	0.0
Post-Masters certificates	258	10.8	0.4
Associate degrees	29	1.2	0.0
Bachelor's degrees	1,456	61.2	2.2
Masters degrees	425	17.9	0.6
Doctoral and First-professional degrees	24	1.0	0.0
LWIA 8: Cheatham, Dickson, Houston, Humphreys, Montgomery, Robertson, Stewart, Sumner and Williamson Counties			
Awards of less than 1 academic year	386	13.1	0.6
Awards at least 1 but less than 2 academic years	174	5.9	0.3
Post-Masters certificates	8	0.3	0.0
Associate degrees	947	32.1	1.4
Bachelor's degrees	1,223	41.4	1.8
Masters degrees	215	7.3	0.3
LWIA 9: Davidson, Rutherford, Trousdale, and Wilson Counties			
Awards of less than 1 academic year	463	2.7	0.7
Awards at least 1 but less than 2 academic years	1,712	9.9	2.5
Awards at least 2 but less than 4 academic years	21	0.1	0.0
Postbaccalaureate certificates	51	0.3	0.1
Post-Masters certificates	114	0.7	0.2
Associate degrees	1,874	10.8	2.8
Bachelor's degrees	8,906	51.3	13.2
Masters degrees	3,341	19.2	4.9
Doctoral and First-professional degrees	883	5.1	1.3
LWIA 10: Giles, Hickman, Lawrence, Lewis, Marshall, Maury, Perry and Wayne Counties			
Awards of less than 1 academic year	17	2.6	0.0
Awards at least 1 but less than 2 academic years	47	7.2	0.1
Associate degrees	487	74.2	0.7
Bachelor's degrees	105	16.0	0.2

Level of Award	Number of Awards in Academic Year 2008	2008 Awards as a Percentage of	
		LWIA	Total
LWIA 11: Benton, Carroll, Chester, Decatur, Hardeman, Hardin, Haywood, Henderson, Henry, McNairy, Madison, and Weakley Counties			
Awards of less than 1 academic year	58	1.4	0.1
Awards at least 1 but less than 2 academic years	153	3.7	0.2
Post-Masters certificates	107	2.6	0.2
Associate degrees	499	12.1	0.7
Bachelor's degrees	2,664	64.8	3.9
Masters degrees	613	14.9	0.9
Doctoral and First-professional degrees	14	0.3	0.0
LWIA 12: Crockett, Dyer, Gibson, Lake, Lauderdale, Obion and Tipton Counties			
Awards of less than 1 academic year	11	5.3	0.0
Awards at least 1 but less than 2 academic years	9	4.3	0.0
Associate degrees	187	90.3	0.3
LWIA 13: Fayette and Shelby Counties			
Awards of less than 1 academic year	1,957	21.7	2.9
Awards at least 1 but less than 2 academic years	295	3.3	0.4
Awards at least 2 but less than 4 academic years	29	0.3	0.0
Postbaccalaureate certificates	50	0.6	0.1
Post-Masters certificates	12	0.1	0.0
Associate degrees	1,475	16.3	2.2
Bachelor's degrees	3,687	40.9	5.5
Masters degrees	1,105	12.2	1.6
Doctoral and First-professional degrees	413	4.6	0.6

APPENDIX 2: PROJECTED AWARDS BY INDIVIDUAL INSTRUCTIONAL PROGRAM, INCLUDING CERTIFICATES FROM INSTITUTIONS THAT OFFER ASSOCIATES OR MORE ADVANCED AWARDS

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
Awards of less than 1 academic year						
510801	Medical/Clinical Assistant		524	1,149	1,533	625
510904	Emergency Medical Technology/Technician (EMT Paramedic)		262	554	652	292
510601	Dental Assisting/Assistant		134	355	506	221
510713	Medical Insurance Coding Specialist/Coder		28	161	229	133
510805	Pharmacy Technician/Assistant		62	180	254	118
512602	Home Health Aide/Home Attendant		100	211	251	112
510907	Medical Radiologic Technology/Science - Radiation Therapist		23	97	97	74
510714	Medical Insurance Specialist/Medical Biller		11	64	109	53
513501	Massage Therapy/Therapeutic Massage		56	105	120	49
190799	Human Development, Family Studies, & Related Services, Other		14	60	107	45
120499	Cosmetology and Related Personal Grooming Arts, Other		8	50	80	42
529999	Business, Management, Marketing, & Related Support Services, Other		12	52	85	40
150303	Electrical, Electronic & Communications Engineering Technology/Technician	Yes	13	45	67	32
110202	Computer Programming, Specific Applications	Yes	15	43	54	28
510710	Medical Office Assistant/Specialist		10	38	67	28
511099	Clinical/Medical Laboratory Science & Allied Professions, Other		21	48	72	28
470608	Aircraft Powerplant Technology/Technician		64	90	65	27
120410	Nail Technician/Specialist and Manicurist		7	33	49	26
120409	Aesthetician/Esthetician and Skin Care Specialist		5	31	51	26
520302	Accounting Technology/Technician and Bookkeeping		10	30	43	21
151201	Computer Engineering Technology/Technician	Yes	5	24	33	19
430107	Criminal Justice/Police Science		147	166	165	19
519999	Health Professions and Related Clinical Sciences, Other		8	27	0	19
150101	Architectural Engineering Technology/Technician	Yes	5	21	37	17
510812	Respiratory Therapy Technician/Assistant		3	18	11	15
510911	Radiologic Technology/Science - Radiographer		6	20	29	14
010605	Landscaping and Groundskeeping	Yes	5	19	25	14
111002	System, Networking, and LAN/WAN Management/Manager	Yes	3	17	30	14
120406	Make-Up Artist/Specialist		16	30	35	13
190505	Foodservice Systems Administration/Management		3	16	27	13
510908	Respiratory Care Therapy/Therapist		8	20	30	12
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician		12	22	21	10
511501	Substance Abuse/Addiction Counseling		20	30	43	10
110801	Web Page, Digital/Multimedia & Information Resources Design	Yes	4	14	24	10
510705	Medical Office Management/Administration		140	149	157	10
150702	Quality Control Technology/Technician	Yes	6	15	22	9
510707	Health Information/Medical Records Technology/Technician		29	36	29	7
511001	Blood Bank Technology Specialist		22	29	24	7
439999	Security and Protective Services, Other		1	8	10	7
380203	Christian Studies		2	8	17	6
460302	Electrician		23	29	36	6
190706	Child Development		70	75	82	5
110901	Computer Systems Networking and Telecommunications	Yes	3	8	14	5
520407	Business/Office Automation/Technology/Data Entry		11	15	18	4
110601	Data Entry/Microcomputer Applications, General		1	5	9	4
520203	Logistics and Materials Management		1	4	2	3

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
479999	Mechanic and Repair Technologies/Technicians, Other		12	14	8	3
120503	Culinary Arts/Chef Training		10	13	12	2
220302	Legal Assistant/Paralegal		15	16	0	2
250301	Library Assistant/Technician		0	2	1	2
150613	Manufacturing Technology/Technician	Yes	1	2	4	1
151301	Drafting and Design Technology/Technician, General	Yes	6	7	7	1
520101	Business/Commerce, General		4	5	0	1
520701	Entrepreneurship/Entrepreneurial Studies		0	1	2	1
469999	Construction Trades, Other		0	1	1	1
500602	Cinematography and Film/Video Production		0	1	0	0
510706	Health Information/Medical Records Administration/ Administrator		0	1	0	0
520208	E-Commerce/Electronic Commerce		0	1	0	0
520301	Accounting		0	1	0	0
010601	Applied Horticulture/Horticultural Operations, General	Yes	0	0	1	0
410301	Chemical Technology/Technician	Yes	0	0	1	0
110203	Computer Programming, Vendor/Product Certification	Yes	0	1	1	0
231101	Technical and Business Writing		0	1	0	0
480508	Welding Technology/Welder		2	2	0	0
110699	Data Entry/Microcomputer Applications, Other		0	0	0	0
240101	Liberal Arts and Sciences/Liberal Studies		0	0	0	0
010607	Turf and Turfgrass Management	Yes	1	1	0	0
430109	Security and Loss Prevention Services		0	0	0	0
510712	Medical Reception/Receptionist		1	1	0	0
151202	Computer Technology/Computer Systems Technology	Yes	3	2	0	0
510802	Clinical/Medical Laboratory Assistant		1	1	0	0
390604	Pre-Theology/Pre-Ministerial Studies		1	0	0	-1
510799	Health and Medical Administrative Services, Other		2	1	0	-1
150507	Environmental Engineering Technology/Environmental Technology	Yes	1	0	0	-1
150612	Industrial Technology/Technician	Yes	1	0	0	-1
521801	Sales, Distribution, and Marketing Operations, General		1	0	0	-1
510708	Medical Transcription/Transcriptionist		28	28	33	-1
110501	Computer Systems Analysis/Analyst	Yes	1	0	0	-1
110401	Information Science/Studies	Yes	3	2	0	-1
521909	Special Products Marketing Operations		2	0	0	-2
119999	Computer and Information Sciences & Support Services, Other		2	0	0	-2
520801	Finance, General		2	0	0	-2
190708	Child Care and Support Services Management		3	0	0	-3
470303	Industrial Mechanics and Maintenance Technology		3	0	0	-3
520399	Accounting and Related Services, Other		5	2	0	-4
450702	Cartography		9	4	4	-5
521201	Management Information Systems, General		6	0	0	-6
150403	Electromechanical Technology/Electromechanical Engineering Technology	Yes	7	1	0	-6
521299	Management Information Systems and Services, Other		8	2	0	-7
520201	Business Administration and Management, General		11	4	0	-7
520408	General Office Occupations and Clerical Services		8	0	0	-8
500605	Photography		14	4	0	-10
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other		16	6	0	-10

CIP	Program	STEM	Average Annual Graduates Per Academic Year		2018	Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18		
510716	Medical Administrative/Executive Assistant & Medical Secretary		12	0	0	-12
320101	Basic Skills, General		15	1	0	-15
430203	Fire Science/Firefighting		22	1	0	-21
520401	Administrative Assistant and Secretarial Science, General		30	7	0	-23
520204	Office Management and Supervision		27	2	0	-24
521501	Real Estate		40	0	0	-40
470607	Airframe Mechanics & Aircraft Maintenance Technology/Technician		62	0	0	-62
	Awards at least 1 but less than 2 academic years					
510801	Medical/Clinical Assistant		182	564	863	381
510805	Pharmacy Technician/Assistant		109	282	410	172
470603	Autobody/Collision and Repair Technology/Technician		255	415	558	160
510707	Health Information/Medical Records Technology/Technician		58	213	278	155
470605	Diesel Mechanics Technology/Technician		90	223	335	133
510909	Surgical Technology/Technologist		70	186	275	116
470614	Alternative Fuel Vehicle Technology/Technician		22	131	135	108
470201	Heating, Air Conditioning, Ventilation & Refrigeration Maintenance Technology/Technician		53	158	220	105
510710	Medical Office Assistant/Specialist		32	130	198	98
510601	Dental Assisting/Assistant		51	144	193	93
470699	Vehicle Maintenance and Repair Technologies, Other		37	128	199	91
479999	Mechanic and Repair Technologies/Technicians, Other		15	91	104	76
510714	Medical Insurance Specialist/Medical Biller		27	85	158	58
460302	Electrician		40	89	112	49
120499	Cosmetology and Related Personal Grooming Arts, Other		10	57	55	47
510716	Medical Administrative/Executive Assistant & Medical Secretary		14	61	85	46
150501	Heating, Air Conditioning & Refrigeration Technology/Technician	Yes	10	50	72	40
510713	Medical Insurance Coding Specialist/Coder		8	47	84	39
510905	Nuclear Medical Technology/Technologist		19	52	65	33
190706	Child Development		8	38	53	30
110103	Information Technology	Yes	10	38	61	28
320101	Basic Skills, General		11	37	66	25
500999	Music, Other		20	38	45	18
470302	Heavy Equipment Maintenance Technology/Technician		11	26	32	14
520203	Logistics and Materials Management		5	18	29	13
510799	Health and Medical Administrative Services, Other		3	15	9	13
220302	Legal Assistant/Paralegal		6	17	31	11
470615	Engine Machinist		2	13	12	11
520408	General Office Occupations and Clerical Services		5	15	27	10
470607	Airframe Mechanics & Aircraft Maintenance Technology/Technician		13	21	17	8
410301	Chemical Technology/Technician	Yes	2	9	13	8
151301	Drafting and Design Technology/Technician, General	Yes	8	15	13	7
520301	Accounting		5	11	21	7
110699	Data Entry/Microcomputer Applications, Other		2	8	16	6
510901	Cardiovascular Technology/Technologist		1	7	4	6
480508	Welding Technology/Welder		20	26	26	6
110101	Computer and Information Sciences, General	Yes	3	9	14	5
120301	Funeral Service and Mortuary Science, General		2	7	4	5

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
510706	Health Information/Medical Records Administration/Administrator		5	10	12	5
500903	Music Performance, General		1	6	11	5
131202	Elementary Education and Teaching		1	6	10	4
470613	Medium/Heavy Vehicle and Truck Technology/Technician		1	5	4	4
480503	Machine Shop Technology/Assistant		8	12	22	4
520101	Business/Commerce, General		1	4	3	4
511009	Phlebotomy/Phlebotomist		1	4	6	3
510907	Medical Radiologic Technology/Science - Radiation Therapist		17	20	18	3
111002	System, Networking, and LAN/WAN Management/Manager	Yes	1	4	7	3
151302	CAD/CADD Drafting and/or Design Technology/Technician	Yes	3	5	7	2
150613	Manufacturing Technology/Technician	Yes	1	3	5	2
520201	Business Administration and Management, General		4	5	8	2
520701	Entrepreneurship/Entrepreneurial Studies		0	2	3	2
480501	Machine Tool Technology/Machinist		1	2	4	1
390601	Theology/Theological Studies		0	1	3	1
430107	Criminal Justice/Police Science		0	2	1	1
090702	Digital Communication and Media/Multimedia		0	1	2	1
150405	Robotics Technology/Technician	Yes	0	1	2	1
500909	Music Management and Merchandising		0	1	2	1
512099	Pharmacy, Pharmaceutical Sciences, and Administration, Other		0	1	2	1
110901	Computer Systems Networking and Telecommunications	Yes	1	2	0	1
510705	Medical Office Management/Administration		0	1	0	0
520299	Business Administration, Management and Operations, Other		0	1	0	0
520399	Accounting and Related Services, Other		1	2	2	0
520208	E-Commerce/Electronic Commerce		0	1	1	0
513501	Massage Therapy/Therapeutic Massage		105	105	57	0
470104	Computer Installation and Repair Technology/Technician		3	3	0	0
110501	Computer Systems Analysis/Analyst	Yes	0	0	0	0
519999	Health Professions and Related Clinical Sciences, Other		0	0	0	0
260209	Radiation Biology/Radiobiology	Yes	0	0	0	0
520499	Business Operations Support and Secretarial Services, Other		0	0	0	0
529999	Business, Management, Marketing, & Related Support Services, Other		0	0	0	0
470303	Industrial Mechanics and Maintenance Technology		10	9	8	0
220301	Legal Administrative Assistant/Secretary		0	0	0	0
509999	Visual and Performing Arts, Other		0	0	0	0
090701	Radio and Television		1	0	0	-1
110201	Computer Programming/Programmer, General	Yes	1	1	0	-1
470608	Aircraft Powerplant Technology/Technician		5	4	9	-1
110701	Computer Science	Yes	3	2	0	-1
470101	Electrical/Electronics Equipment Installation & Repair, General		1	0	0	-1
150612	Industrial Technology/Technician	Yes	1	0	0	-1
240101	Liberal Arts and Sciences/Liberal Studies		2	1	1	-2
120401	Cosmetology/Cosmetologist, General		27	25	10	-2
520407	Business/Office Automation/Technology/Data Entry		2	0	0	-2
390201	Bible/Biblical Studies		3	1	0	-2
511613	Licensed Practical /Vocational Nurse Training (LPN, LVN, Cert, Dipl, AAS)		5	0	0	-5
119999	Computer and Information Sciences & Support Services, Other		7	2	0	-5

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician		11	6	11	-5
510908	Respiratory Care Therapy/Therapist		6	0	0	-6
110301	Data Processing and Data Processing Technology/Technician	Yes	10	3	0	-7
510708	Medical Transcription/Transcriptionist		11	3	0	-8
151306	Mechanical Drafting and Mechanical Drafting CAD/CADD	Yes	18	10	14	-8
520302	Accounting Technology/Technician and Bookkeeping		31	21	23	-9
510904	Emergency Medical Technology/Technician (EMT Paramedic)		110	92	101	-18
520401	Administrative Assistant and Secretarial Science, General		71	13	0	-58
470604	Automobile/Automotive Mechanics Technology/Technician		604	467	511	-137
	Associate degrees					
240101	Liberal Arts and Sciences/Liberal Studies		2,868	4,068	4,969	1,201
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		997	1,739	2,254	742
510801	Medical/Clinical Assistant		242	659	1,024	417
110901	Computer Systems Networking and Telecommunications	Yes	125	397	553	272
513501	Massage Therapy/Therapeutic Massage		99	322	474	223
510909	Surgical Technology/Technologist		104	303	443	199
510714	Medical Insurance Specialist/Medical Biller		35	204	354	169
110801	Web Page, Digital/Multimedia & Information Resources Design	Yes	44	201	325	157
510908	Respiratory Care Therapy/Therapist		107	227	301	120
430103	Criminal Justice/Law Enforcement Administration		24	144	243	119
510907	Medical Radiologic Technology/Science - Radiation Therapist		170	285	355	115
510911	Radiologic Technology/Science - Radiographer		79	191	210	112
150000	Engineering Technology, General	Yes	43	140	244	97
510805	Pharmacy Technician/Assistant		24	106	176	81
510899	Allied Health and Medical Assisting Services, Other		22	96	143	74
510707	Health Information/Medical Records Technology/Technician		63	130	184	67
151302	CAD/CADD Drafting and/or Design Technology/Technician	Yes	32	99	116	66
510601	Dental Assisting/Assistant		14	68	109	55
190706	Child Development		81	136	111	54
521902	Fashion Merchandising		12	62	105	50
500406	Commercial Photography		17	66	90	49
150501	Heating, Air Conditioning & Refrigeration Technology/Technician (ACH/ACR/ACHR/HRAC/HVAC/AC Technology)	Yes	13	62	92	49
111003	Computer and Information Systems Security	Yes	12	55	90	43
500408	Interior Design		35	77	99	43
520204	Office Management and Supervision		10	50	92	40
110899	Computer Software and Media Applications, Other		10	47	64	36
511004	Clinical/Medical Laboratory Technician		49	85	117	36
510806	Physical Therapist Assistant		106	140	182	34
500409	Graphic Design		7	37	64	30
150612	Industrial Technology/Technician	Yes	85	115	126	30
430203	Fire Science/Firefighting		27	54	67	27
470605	Diesel Mechanics Technology/Technician		14	38	56	24
430104	Criminal Justice/Safety Studies		27	51	73	24
130101	Education, General		9	32	16	23
470604	Automobile/Automotive Mechanics Technology/ Technician		58	80	94	23
510803	Occupational Therapist Assistant		28	50	63	22

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
520905	Restaurant/Food Services Management		6	29	63	22
510706	Health Information/Medical Records Administration/Administrator		15	35	56	20
510901	Cardiovascular Technology/Technologist		13	31	45	18
430199	Corrections and Criminal Justice, Other		5	21	35	17
120503	Culinary Arts/Chef Training		8	24	39	16
100105	Communications Technology/Technician		3	18	11	15
240102	General Studies		117	132	153	15
520208	E-Commerce/Electronic Commerce		4	18	22	14
470000	Mechanics and Repairers, General		3	17	26	14
512308	Physical Therapy/Therapist		4	16	22	12
511803	Opthalmic Technician/Technologist		5	17	26	12
510705	Medical Office Management/Administration		6	17	35	12
511105	Pre-Nursing Studies		6	17	25	11
111001	System Administration/Administrator	Yes	5	16	20	11
450702	Cartography		5	16	27	11
470699	Vehicle Maintenance and Repair Technologies, Other		4	14	24	10
110199	Computer and Information Sciences, Other		2	12	24	10
521801	Sales, Distribution, and Marketing Operations, General		10	19	34	9
150613	Manufacturing Technology/Technician	Yes	2	11	19	9
131309	Technology Teacher Education/Industrial Arts Teacher Education		4	11	15	7
449999	Public Administration and Social Service Professions, Other		3	10	11	7
520407	Business/Office Automation/Technology/Data Entry		6	13	17	7
520299	Business Administration, Management and Operations, Other		75	81	96	7
220302	Legal Assistant/Paralegal		171	177	194	6
010699	Applied Horticulture/Horicultural Business Services, Other	Yes	3	9	14	6
111002	System, Networking, and LAN/WAN Management/Manager	Yes	1	7	8	6
510713	Medical Insurance Coding Specialist/Coder		1	7	4	6
010601	Applied Horticulture/Horticultural Operations, General	Yes	1	7	13	5
510904	Emergency Medical Technology/Technician (EMT Paramedic)		4	9	12	5
512202	Environmental Health		4	9	11	5
470201	Heating, Air Conditioning, Ventilation & Refrigeration Maintenance Technology/Technician		3	8	14	5
380203	Christian Studies		2	6	10	5
261201	Biotechnology	Yes	1	5	7	4
470603	Autobody/Collision and Repair Technology/Technician		15	18	15	4
500605	Photography		2	5	9	3
511104	Pre-Veterinary Studies		1	4	9	3
470609	Avionics Maintenance Technology/Technician		50	53	62	3
220303	Court Reporting/Court Reporter		2	4	7	3
390201	Bible/Biblical Studies		22	25	23	3
131210	Early Childhood Education and Teaching		1	3	6	3
511103	Pre-Pharmacy Studies		3	5	7	2
390601	Theology/Theological Studies		1	3	6	2
430112	Securities Services Administration/Management		0	2	2	2
470399	Heavy/Industrial Equipment Maintenance Technologies, Other		1	3	3	2
520305	Accounting and Business/Management		1	3	4	2
090102	Mass Communication/Media Studies		1	2	5	2
470302	Heavy Equipment Maintenance Technology/Technician		1	3	5	2
520301	Accounting		28	29	28	2
120401	Cosmetology/Cosmetologist, General		0	2	2	2

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
110203	Computer Programming, Vendor/Product Certification	Yes	5	6	5	2
151202	Computer Technology/Computer Systems Technology	Yes	28	30	45	2
440000	Human Services, General		0	2	4	2
099999	Communication, Journalism, and Related Programs, Other		0	2	2	2
260101	Biology/Biological Sciences, General	Yes	0	2	3	1
010106	Agricultural Business Technology	Yes	0	1	3	1
151303	Architectural Drafting and Architectural CAD/CADD	Yes	0	1	1	1
511009	Phlebotomy/Phlebotomist		0	1	1	1
131205	Secondary Education and Teaching		3	4	3	1
512306	Occupational Therapy/Therapist		1	2	0	1
140101	Engineering, General	Yes	3	4	1	1
511101	Pre-Dentistry Studies		1	1	3	1
480501	Machine Tool Technology/Machinist		0	1	1	1
131202	Elementary Education and Teaching		5	6	8	1
400501	Chemistry, General	Yes	0	1	2	1
500501	Drama and Dramatics/Theatre Arts, General		0	1	1	1
520206	Non-Profit/Public/Organizational Management		0	1	2	1
390701	Pastoral Studies/Counseling		0	1	1	1
030501	Forestry, General	Yes	1	1	1	0
310505	Kinesiology and Exercise Science		0	1	0	0
510913	Athletic Training/Trainer		0	1	0	0
190501	Foods, Nutrition, and Wellness Studies, General		1	1	1	0
109999	Communications Technologies/Technicians & Support Services, Other		0	0	1	0
131312	Music Teacher Education		0	0	1	0
390301	Missions/Missionary Studies and Missiology		0	0	1	0
450601	Economics, General		0	0	1	0
010901	Animal Sciences, General	Yes	1	1	2	0
090499	Journalism, Other		0	0	0	0
310501	Health and Physical Education, General		1	1	2	0
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)		0	0	0	0
190709	Child Care Provider/Assistant		0	0	0	0
190901	Apparel and Textiles, General		0	0	0	0
451101	Sociology		0	0	0	0
480507	Tool and Die Technology/Technician		0	0	0	0
520399	Accounting and Related Services, Other		0	0	0	0
511199	Health/Medical Preparatory Programs, Other		1	1	1	0
240103	Humanities/Humanistic Studies		0	0	0	0
149999	Engineering, Other		0	0	0	0
159999	Engineering Technologies/Technicians, Other		0	0	0	0
540101	History, General		0	0	0	0
230101	English Language and Literature, General		0	0	0	0
390699	Theological and Ministerial Studies, Other		0	0	0	0
450101	Social Sciences, General		0	0	0	0
510912	Physician Assistant		0	0	0	0
100202	Radio and Television Broadcasting Technology/Technician		0	0	0	0
420101	Psychology, General		1	1	0	0
220001	Pre-Law Studies		1	0	0	0
150401	Biomedical Technology/Technician	Yes	1	0	0	-1
521299	Management Information Systems and Services, Other		1	0	0	-1
150405	Robotics Technology/Technician	Yes	1	0	0	-1

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
390604	Pre-Theology/Pre-Ministerial Studies		1	0	0	-1
520901	Hospitality Administration/Management, General		1	0	0	-1
150701	Occupational Safety and Health Technology/Technician	Yes	1	0	0	-1
090101	Communication Studies/Speech Communication and Rhetoric		1	0	0	-1
430107	Criminal Justice/Police Science		89	88	96	-1
030511	Forest Technology/Technician	Yes	1	0	0	-1
520904	Hotel/Motel Administration/Management		12	11	3	-1
510808	Veterinary/Animal Health Technology/Technician & Veterinary Assistant		27	26	18	-1
513104	Dietitian Assistant		6	5	3	-1
090701	Radio and Television		1	0	0	-1
389999	Philosophy and Religious Studies, Other		1	0	0	-1
309999	Multi-/Interdisciplinary Studies, Other		2	1	1	-1
150503	Energy Management and Systems Technology/Technician	Yes	2	0	0	-2
511699	Nursing, Other		2	0	0	-2
500901	Music, General		2	0	0	-2
510203	Speech-Language Pathology/Pathologist		2	0	1	-2
110103	Information Technology	Yes	75	73	0	-2
150507	Environmental Engineering Technology/Environmental Technology	Yes	2	0	0	-2
511102	Pre-Medicine/Pre-Medical Studies		3	0	0	-2
520402	Executive Assistant/Executive Secretary		2	0	0	-2
521905	Tourism and Travel Services Marketing Operations		2	0	0	-2
480508	Welding Technology/Welder		3	0	0	-3
500702	Fine/Studio Arts, General		3	0	0	-3
480503	Machine Shop Technology/Assistant		4	0	0	-4
150101	Architectural Engineering Technology/Technician	Yes	16	12	4	-4
479999	Mechanic and Repair Technologies/Technicians, Other		4	0	0	-4
470303	Industrial Mechanics and Maintenance Technology		5	0	0	-5
010603	Ornamental Horticulture	Yes	11	6	3	-5
500602	Cinematography and Film/Video Production		12	6	3	-5
410301	Chemical Technology/Technician	Yes	6	0	0	-6
511801	Opticianry/Ophthalmic Dispensing Optician		15	8	3	-7
010000	Agriculture, General	Yes	9	2	0	-7
260209	Radiation Biology/Radiobiology	Yes	7	0	0	-7
470101	Electrical/Electronics Equipment Installation & Repair, General		10	2	0	-7
150403	Electromechanical Technology/Electromechanical Engineering Technology	Yes	8	0	0	-7
440201	Community Organization and Advocacy		29	22	17	-8
120301	Funeral Service and Mortuary Science, General		31	23	17	-8
240199	Liberal Arts & Sciences, General Studies & Humanities, Other		9	0	0	-8
161603	Sign Language Interpretation and Translation		12	2	0	-10
150201	Civil Engineering Technology/Technician	Yes	14	4	0	-10
151399	Drafting/Design Engineering Technologies/Technicians, Other		11	0	0	-11
150805	Mechanical Engineering/Mechanical Technology/Technician	Yes	27	14	11	-13
520201	Business Administration and Management, General		524	508	524	-16
110401	Information Science/Studies	Yes	25	9	0	-16
529999	Business, Management, Marketing, & Related Support Services, Other		28	11	19	-17
510716	Medical Administrative/Executive Assistant & Medical Secretary		20	0	0	-20
110201	Computer Programming/Programmer, General	Yes	21	0	0	-21

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
520302	Accounting Technology/Technician and Bookkeeping		98	77	70	-22
110701	Computer Science	Yes	24	0	0	-24
510602	Dental Hygiene/Hygienist		63	39	32	-24
151201	Computer Engineering Technology/Technician	Yes	27	2	0	-25
520101	Business/Commerce, General		47	22	0	-26
150303	Electrical, Electronic & Communications Engineering Technology/Technician	Yes	191	161	64	-30
119999	Computer and Information Sciences & Support Services, Other		44	11	0	-33
519999	Health Professions and Related Clinical Sciences, Other		57	19	13	-39
419999	Science Technologies/Technicians, Other		189	144	155	-45
500402	Commercial and Advertising Art		145	99	55	-46
520401	Administrative Assistant and Secretarial Science, General		165	102	76	-62
151301	Drafting and Design Technology/Technician, General	Yes	78	1	0	-77
110101	Computer and Information Sciences, General	Yes	89	4	0	-85
150399	Electrical & Electronic Engineering Technologies/Technicians, Other		116	3	0	-114
521201	Management Information Systems, General		216	44	0	-172

	Awards at least 2 but less than 4 academic years					
510907	Medical Radiologic Technology/Science - Radiation Therapist		8	45	57	37
390604	Pre-Theology/Pre-Ministerial Studies		1	6	5	5
470399	Heavy/Industrial Equipment Maintenance Technologies, Other		8	11	10	3
390201	Bible/Biblical Studies		0	0	1	0
390601	Theology/Theological Studies		0	0	0	0
511005	Clinical Laboratory Science/Medical Technology/Technologist		1	0	0	-1
480501	Machine Tool Technology/Machinist		2	1	0	-2
510602	Dental Hygiene/Hygienist		2	0	0	-2
151399	Drafting/Design Engineering Technologies/Technicians, Other		3	0	0	-3
510799	Health and Medical Administrative Services, Other		4	0	0	-4
479999	Mechanic and Repair Technologies/Technicians, Other		9	0	0	-9
470201	Heating, Air Conditioning, Ventilation & Refrigeration Maintenance Technology/Technician		23	10	10	-13

	Bachelor's degrees					
520201	Business Administration and Management, General		2,175	3,418	4,034	1,243
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		1,152	2,252	3,109	1,101
240101	Liberal Arts and Sciences/Liberal Studies		414	944	1,293	530
451001	Political Science and Government, General		638	1,023	1,236	385
420101	Psychology, General		1,453	1,805	1,962	352
090102	Mass Communication/Media Studies		477	760	951	282
500909	Music Management and Merchandising		436	696	882	260
309999	Multi-/Interdisciplinary Studies, Other		1,274	1,506	1,777	232
521401	Marketing/Marketing Management, General		651	874	1,022	223
131206	Teacher Education, Multiple Levels		145	363	483	218
240102	General Studies		162	370	435	208
090499	Journalism, Other		47	221	337	175
090101	Communication Studies/Speech Communication and Rhetoric		219	393	497	173
430103	Criminal Justice/Law Enforcement Administration		361	530	662	168
131202	Elementary Education and Teaching		349	505	619	156
131210	Early Childhood Education and Teaching		70	215	275	146

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
260101	Biology/Biological Sciences, General	Yes	910	1,050	1,135	140
520801	Finance, General		486	620	699	133
190101	Family and Consumer Sciences/Human Sciences, General		220	347	402	127
230101	English Language and Literature, General		844	966	1,098	121
500702	Fine/Studio Arts, General		145	264	342	119
310504	Sport and Fitness Administration/Management		126	243	306	118
490101	Aeronautics/Aviation/Aerospace Science & Technology, General		100	217	308	117
160905	Spanish Language and Literature		168	285	322	117
151501	Engineering/Industrial Management	Yes	31	132	198	101
540101	History, General		559	654	733	95
519999	Health Professions and Related Clinical Sciences, Other		68	163	219	95
451101	Sociology		389	483	565	94
500903	Music Performance, General		67	160	199	93
141301	Engineering Science	Yes	45	135	209	90
111003	Computer and Information Systems Security	Yes	23	108	164	85
310501	Health and Physical Education, General		306	385	410	79
511699	Nursing, Other		31	103	149	72
520206	Non-Profit/Public/Organizational Management		121	191	284	69
100304	Animation, Interactive Technology, Video Graphics & Special Effects		27	96	144	68
130101	Education, General		70	136	197	67
160101	Foreign Languages and Literatures, General		105	172	209	66
390702	Youth Ministry		22	84	124	62
400501	Chemistry, General	Yes	244	304	333	60
520701	Entrepreneurship/Entrepreneurial Studies		17	76	125	59
500408	Interior Design		64	120	155	56
500999	Music, Other		35	90	128	55
390701	Pastoral Studies/Counseling		14	67	100	53
440000	Human Services, General		24	77	105	53
140501	Biomedical/Medical Engineering	Yes	68	118	152	50
380101	Philosophy		109	157	174	48
510602	Dental Hygiene/Hygienist		57	105	128	48
500409	Graphic Design		11	58	82	47
270101	Mathematics, General	Yes	242	287	328	46
500701	Art/Art Studies, General		230	274	281	44
511199	Health/Medical Preparatory Programs, Other		17	61	88	44
090702	Digital Communication and Media/Multimedia		9	52	88	42
110103	Information Technology	Yes	15	56	93	41
430104	Criminal Justice/Safety Studies		25	64	88	39
510911	Radiologic Technology/Science - Radiographer		9	45	67	36
190401	Family Resource Management Studies, General		58	93	109	35
150303	Electrical, Electronic & Communications Engineering Technology/Technician	Yes	29	64	63	35
540199	History, Other		11	46	72	34
131307	Health Teacher Education		41	73	102	32
190901	Apparel and Textiles, General		36	67	92	31
520799	Entrepreneurial and Small Business Operations, Other		7	38	60	31
090199	Communication and Media Studies, Other		22	53	62	31
131203	Junior High/Intermediate/Middle School Education & Teaching		15	46	69	31
521101	International Business/Trade/Commerce		32	63	83	30
142301	Nuclear Engineering	Yes	14	44	60	29

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
380203	Christian Studies		11	40	62	29
301701	Behavioral Sciences		10	40	43	29
520601	Business/Managerial Economics		122	151	171	29
390601	Theology/Theological Studies		47	74	93	28
300101	Biological and Physical Sciences		19	47	61	28
302501	Cognitive Science		8	35	47	28
131328	History Teacher Education		28	55	73	27
440501	Public Policy Analysis		7	34	52	27
090999	Public Relations, Advertising & Applied Communication, Other		9	36	53	27
510000	Health Services/Allied Health/Health Sciences, General		6	33	51	27
090902	Public Relations/Image Management		60	86	75	25
400801	Physics, General	Yes	56	81	97	25
190501	Foods, Nutrition, and Wellness Studies, General		34	59	77	25
010901	Animal Sciences, General	Yes	84	109	123	25
450201	Anthropology		134	159	172	24
131305	English/Language Arts Teacher Education		38	61	86	24
390604	Pre-Theology/Pre-Ministerial Studies		8	32	58	24
099999	Communication, Journalism, and Related Programs, Other		16	39	49	23
161200	Classics & Classical Languages, Literatures, & Linguistics		24	47	63	23
190701	Human Development and Family Studies, General		80	103	101	23
302401	Neuroscience		40	63	65	23
500602	Cinematography and Film/Video Production		19	41	62	22
131205	Secondary Education and Teaching		66	87	96	21
110801	Web Page, Digital/Multimedia & Information Resources Design	Yes	7	27	40	20
131302	Art Teacher Education		20	40	59	20
160901	French Language and Literature		54	74	86	20
090903	Advertising		100	119	116	19
500101	Visual and Performing Arts, General		33	52	63	19
310505	Kinesiology and Exercise Science		170	189	210	19
522001	Construction Management		4	22	36	18
510702	Hospital & Health Care Facilities Administration/Management		8	27	40	18
011101	Plant Sciences, General	Yes	53	70	69	18
302001	International/Global Studies		4	22	25	17
260204	Molecular Biology	Yes	27	44	79	17
140201	Aerospace, Aeronautical and Astronautical Engineering	Yes	16	33	47	17
100203	Recording Arts Technology/Technician		3	20	25	17
150000	Engineering Technology, General	Yes	108	125	152	17
520305	Accounting and Business/Management		7	24	39	17
261399	Ecology, Evolution, Systematics & Population Biology, Other		4	21	32	16
010000	Agriculture, General	Yes	138	153	197	15
140901	Computer Engineering, General	Yes	61	76	51	15
040401	Environmental Design/Architecture		4	18	32	15
510907	Medical Radiologic Technology/Science - Radiation Therapist		4	18	33	14
380201	Religion/Religious Studies		127	141	141	14
141101	Engineering Mechanics	Yes	4	18	33	14
521902	Fashion Merchandising		13	27	36	14
050201	African-American/Black Studies		9	22	31	13
160501	German Language and Literature		26	38	44	13
260102	Biomedical Sciences, General	Yes	3	16	26	12
261305	Environmental Biology	Yes	3	16	26	12
520208	E-Commerce/Electronic Commerce		4	17	27	12

CIP	Program	STEM	Average Annual Graduates Per Academic Year		2018	Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18		
059999	Area, Ethnic, Cultural, and Gender Studies, Other		57	69	74	11
521001	Human Resources Management/Personnel Administration, General		21	32	37	11
260202	Biochemistry	Yes	25	37	46	11
500911	Violin, Viola, Guitar and Other Stringed Instruments		3	15	23	11
510908	Respiratory Care Therapy/Therapist		16	27	40	11
319999	Parks, Recreation, Leisure and Fitness Studies, Other		3	13	23	11
150613	Manufacturing Technology/Technician	Yes	3	14	20	11
310599	Health and Physical Education/Fitness, Other		9	19	27	11
131308	Family & Consumer Sciences/Home Economics Teacher Education		2	13	23	10
440401	Public Administration		10	20	24	10
030104	Environmental Science	Yes	4	13	20	10
131311	Mathematics Teacher Education		20	30	38	10
510913	Athletic Training/Trainer		29	39	51	10
131099	Special Education and Teaching, Other		9	18	25	9
090901	Organizational Communication, General		3	13	18	9
450901	International Relations and Affairs		57	66	68	9
030101	Natural Resources/Conservation, General	Yes	9	18	17	9
380299	Religion/Religious Studies, Other		3	12	20	9
511005	Clinical Laboratory Science/Medical Technology/Technologist		35	43	57	9
390501	Religious/Sacred Music		6	14	25	9
131303	Business Teacher Education		24	33	44	9
500601	Film/Cinema Studies		2	11	19	9
190403	Consumer Services and Advocacy		2	11	20	9
050122	Regional Studies (U.S., Canadian, Foreign)		3	11	23	8
190000	Work and Family Studies		4	12	20	8
500703	Art History, Criticism and Conservation		33	41	46	8
141901	Mechanical Engineering	Yes	227	235	216	8
520904	Hotel/Motel Administration/Management		38	45	36	8
111001	System Administration/Administrator	Yes	2	9	11	8
390799	Pastoral Counseling and Specialized Ministries, Other		2	9	17	8
449999	Public Administration and Social Service Professions, Other		2	9	10	7
111004	Web/Multimedia Management and Webmaster	Yes	2	9	5	7
050104	East Asian Studies		5	12	12	7
380103	Ethics		4	11	16	7
510706	Health Information/Medical Records Administration/Administrator		21	28	50	7
450605	International Economics		6	13	15	7
270301	Applied Mathematics	Yes	6	13	17	7
131401	Teaching English as a Second or Foreign Language/ESL Language Instructor		5	11	11	6
302301	Intercultural/Multicultural and Diversity Studies		2	8	12	6
131318	Social Studies Teacher Education		21	27	29	6
301501	Science, Technology and Society		2	8	10	6
050207	Women's Studies		6	12	13	6
500605	Photography		8	14	13	6
511105	Pre-Nursing Studies		2	8	11	6
161601	American Sign Language (ASL)		2	7	10	5
420701	Developmental and Child Psychology		41	46	34	5
400599	Chemistry, Other		2	7	9	5

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
500506	Acting		1	6	9	5
420601	Counseling Psychology		1	5	10	4
420901	Industrial and Organizational Psychology		18	22	24	4
400601	Geology/Earth Science, General	Yes	60	64	69	4
220000	Legal Studies, General		3	8	8	4
131332	Geography Teacher Education		1	5	7	4
429999	Psychology, Other		66	70	86	4
230501	Creative Writing		1	5	9	4
050114	Western European Studies		1	5	7	4
260210	Biochemistry/Biophysics and Molecular Biology	Yes	1	5	8	4
131316	Science Teacher Education/General Science Teacher Education		6	10	12	4
131330	Spanish Language Teacher Education		4	8	10	4
240103	Humanities/Humanistic Studies		15	18	22	4
270501	Statistics, General	Yes	11	14	20	3
513101	Dietetics/Dietitian (RD)		7	11	21	3
400101	Physical Sciences	Yes	15	18	26	3
090799	Radio, Television, and Digital Communication, Other		5	8	12	3
500907	Piano and Organ		2	4	6	3
310101	Parks, Recreation and Leisure Studies		9	12	6	3
301801	Natural Sciences		1	3	7	3
160104	Comparative Literature		1	4	7	3
302202	Classical, Ancient Mediterranean & Near Eastern Studies & Archaeology		1	3	6	3
131314	Physical Education Teaching and Coaching		80	82	102	2
131335	Psychology Teacher Education		1	4	5	2
240199	Liberal Arts & Sciences, General Studies & Humanities, Other		4	6	8	2
050110	Russian Studies		2	4	6	2
512501	Veterinary Sciences/Veterinary Clinical Sciences, General (Cert,		1	3	3	2
500904	Music Theory and Composition		5	7	11	2
231101	Technical and Business Writing		6	8	7	2
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)		52	54	60	2
161103	Ancient Near Eastern & Biblical Languages, Literatures, & Linguistics		4	6	11	2
511103	Pre-Pharmacy Studies		1	3	5	2
470103	Communications Systems Installation and Repair Technology		1	3	5	2
500908	Voice and Opera		3	5	9	2
260203	Biophysics	Yes	1	2	3	2
450301	Archeology		2	3	5	2
131325	French Language Teacher Education		1	3	1	2
260406	Cell/Cellular and Molecular Biology	Yes	0	2	2	2
512301	Art Therapy/Therapist		1	2	3	2
190706	Child Development		67	68	68	2
220001	Pre-Law Studies		0	2	3	2
450799	Geography, Other		1	3	5	2
190203	Consumer Merchandising/Retailing Management		1	3	3	2
389999	Philosophy and Religious Studies, Other		18	20	16	2
050103	Asian Studies/Civilization		1	3	2	1
521801	Sales, Distribution, and Marketing Operations, General		2	3	2	1
510201	Communication Disorders, General		1	2	4	1
190505	Foodservice Systems Administration/Management		1	2	4	1

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
131015	Education/Teaching of Individuals in Early Childhood Special Education Programs		0	1	1	1
131324	Drama and Dance Teacher Education		0	1	2	1
421101	Physiological Psychology/Psychobiology		0	1	1	1
510299	Communication Disorders Sciences and Services, Other		0	1	1	1
110401	Information Science/Studies	Yes	3	4	5	1
050299	Ethnic, Cultural Minority, and Gender Studies, Other		1	2	3	1
160902	Italian Language and Literature		2	3	2	1
160402	Russian Language and Literature		6	7	7	1
010102	Agribusiness/Agricultural Business Operations	Yes	25	25	19	1
119999	Computer and Information Sciences & Support Services, Other		7	8	7	1
050106	European Studies/Civilization		5	6	2	1
050107	Latin American Studies		6	7	5	1
159999	Engineering Technologies/Technicians, Other		6	6	0	1
131306	Foreign Language Teacher Education		0	1	2	1
131331	Speech Teacher Education		0	1	2	1
500708	Painting		0	1	1	1
500508	Theatre/Theatre Arts Management		0	1	1	1
100105	Communications Technology/Technician		0	1	2	1
110199	Computer and Information Sciences, Other		1	2	0	1
161603	Sign Language Interpretation and Translation		8	8	9	1
110899	Computer Software and Media Applications, Other		0	1	0	0
239999	English Language and Literature/Letters, Other		0	1	0	0
500502	Technical Theatre/Theatre Design and Technology		0	1	0	0
520304	Accounting and Finance		0	1	0	0
380206	Jewish/Judaic Studies		0	1	1	0
161202	Ancient/Classical Greek Language and Literature		0	1	2	0
420201	Clinical Psychology		0	0	1	0
430106	Forensic Science and Technology		0	0	1	0
540102	American History (United States)		0	0	1	0
301401	Museology/Museum Studies		1	1	0	0
400802	Atomic/Molecular Physics	Yes	0	0	1	0
513199	Dietetics and Clinical Nutrition Services, Other		1	2	0	0
450299	Anthropology, Other		1	1	0	0
140401	Architectural Engineering	Yes	12	12	10	0
500912	Music Pedagogy		1	1	0	0
131012	Education/Teaching of Individuals with Speech or Language Impairments		0	0	0	0
521304	Actuarial Science	Yes	1	1	0	0
400899	Physics, Other		0	0	0	0
019999	Agriculture, Agriculture Operations, & Related Sciences, Other	Yes	6	6	0	0
190599	Foods, Nutrition, and Related Services, Other		0	0	0	0
011001	Food Science	Yes	9	9	6	0
410101	Biology Technician/Biotechnology Laboratory Technician	Yes	0	0	0	0
510912	Physician Assistant		0	0	0	0
511101	Pre-Dentistry Studies		0	0	0	0
131011	Education/Teaching of Individuals with Specific Learning Disabilities		1	1	0	0
161299	Classics & Classical Languages, Literatures, & Linguistics, Other		0	0	0	0
131326	German Language Teacher Education		0	0	0	0
150805	Mechanical Engineering/Mechanical Technology/Technician	Yes	0	0	0	0

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
261301	Ecology	Yes	0	0	0	0
512207	Public Health Education and Promotion		0	0	0	0
512305	Music Therapy/Therapist		0	0	0	0
111099	Computer/Information Technology Services Administration & Management, Other		1	1	0	0
131323	Chemistry Teacher Education		0	0	0	0
190499	Family and Consumer Economics and Related Services, Other		0	0	0	0
450701	Geography		49	49	38	0
260301	Botany/Plant Biology	Yes	1	0	0	-1
419999	Science Technologies/Technicians, Other		1	0	0	-1
161203	Latin Language and Literature		2	1	0	-1
149999	Engineering, Other		1	0	0	-1
301301	Medieval and Renaissance Studies		1	0	0	-1
030502	Forest Sciences and Biology	Yes	3	2	5	-1
511503	Clinical/Medical Social Work		1	0	0	-1
512399	Rehabilitation and Therapeutic Professions, Other		1	0	0	-1
131310	Sales & Marketing Operations/Marketing & Distribution Teacher Education		1	0	0	-1
500401	Design and Visual Communications, General		14	13	8	-1
510202	Audiology/Audiologist and Hearing Sciences		8	7	8	-1
140301	Agricultural/Biological Engineering and Bioengineering	Yes	6	5	5	-1
451201	Urban Studies/Affairs		7	6	1	-1
141201	Engineering Physics	Yes	2	1	2	-1
509999	Visual and Performing Arts, Other		1	0	0	-1
260701	Zoology/Animal Biology	Yes	2	0	0	-1
521701	Insurance		2	0	0	-1
131301	Agricultural Teacher Education		10	9	10	-1
050199	Area Studies, Other		3	2	2	-2
151102	Surveying Technology/Surveying	Yes	12	10	4	-2
300801	Mathematics and Computer Science		6	4	3	-2
090402	Broadcast Journalism		23	21	19	-2
450401	Criminology		2	0	0	-2
511104	Pre-Veterinary Studies		2	0	0	-2
260499	Cell/Cellular Biology and Anatomical Sciences, Other		9	6	0	-2
010199	Agricultural Business and Management, Other	Yes	18	15	17	-2
500599	Dramatic/Theatre Arts and Stagecraft, Other		2	0	0	-2
141801	Materials Engineering	Yes	5	3	1	-2
010101	Agricultural Business and Management, General	Yes	2	0	0	-2
450699	Economics, Other		4	1	0	-2
520901	Hospitality Administration/Management, General		3	0	0	-3
190601	Housing and Human Environments, General		3	0	0	-3
511004	Clinical/Medical Laboratory Technician		3	0	0	-3
220302	Legal Assistant/Paralegal		16	12	12	-3
150801	Aeronautical/Aerospace Engineering Technology/Technician	Yes	8	5	0	-3
150101	Architectural Engineering Technology/Technician	Yes	4	0	0	-4
030599	Forestry, Other	Yes	4	0	0	-4
131312	Music Teacher Education		49	46	50	-4
511002	Cytotechnology/Cytotechnologist		5	0	0	-4
521099	Human Resources Management and Services, Other		5	0	0	-5
230401	English Composition		5	0	0	-5

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
150507	Environmental Engineering Technology/Environmental Technology	Yes	5	0	0	-5
500799	Fine Arts and Art Studies, Other		6	0	0	-6
521501	Real Estate		7	0	0	-6
511102	Pre-Medicine/Pre-Medical Studies		9	3	0	-6
420301	Cognitive Psychology and Psycholinguistics		7	1	0	-6
030501	Forestry, General	Yes	16	10	3	-7
131309	Technology Teacher Education/Industrial Arts Teacher Education		7	0	0	-7
269999	Biological and Biomedical Sciences, Other		12	5	0	-7
131322	Biology Teacher Education		8	1	0	-7
260503	Medical Microbiology and Bacteriology	Yes	7	0	0	-7
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician		11	3	0	-8
500902	Music History, Literature, and Theory		8	0	0	-8
030201	Natural Resources Management and Policy	Yes	26	18	11	-8
521499	Marketing, Other		8	0	0	-8
430199	Corrections and Criminal Justice, Other		9	1	0	-8
510905	Nuclear Medical Technology/Technologist		12	4	0	-8
131399	Teacher Education & Professional Development, Specific Subject Areas, Other		8	0	0	-8
529999	Business, Management, Marketing, & Related Support Services, Other		9	0	0	-9
510203	Speech-Language Pathology/Pathologist		31	22	12	-9
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other		9	0	0	-9
520401	Administrative Assistant and Secretarial Science, General		10	1	0	-9
521804	Selling Skills and Sales Operations		10	1	0	-10
520803	Banking and Financial Support Services		10	0	0	-10
520205	Operations Management and Supervision		19	9	0	-10
050102	American/United States Studies/Civilization		13	2	0	-11
151201	Computer Engineering Technology/Technician	Yes	15	5	2	-11
390301	Missions/Missionary Studies and Missiology		16	5	0	-11
511608	Nursing Science (MS, PhD)		12	0	0	-12
510204	Audiology/Audiologist & Speech-Language		13	0	0	-13
512201	Public Health, General (MPH, DPH)		31	18	12	-13
512202	Environmental Health		14	0	0	-13
390699	Theological and Ministerial Studies, Other		14	0	0	-14
440701	Social Work		323	307	250	-16
500402	Commercial and Advertising Art		46	30	38	-16
510701	Health/Health Care Administration/Management		25	9	0	-17
390201	Bible/Biblical Studies		209	192	212	-17
150399	Electrical & Electronic Engineering Technologies/Technicians, Other		18	0	0	-18
030601	Wildlife and Wildlands Science and Management	Yes	51	33	27	-19
399999	Theology and Religious Vocations, Other		25	4	0	-21
131319	Technical Teacher Education		31	6	0	-24
450101	Social Sciences, General		228	203	137	-25
459999	Social Sciences, Other		39	13	0	-25
030103	Environmental Studies	Yes	27	1	0	-26
500501	Drama and Dramatics/Theatre Arts, General		185	159	163	-26
440201	Community Organization and Advocacy		28	2	0	-27

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
010603	Ornamental Horticulture	Yes	27	0	0	-27
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		27	0	0	-27
140801	Civil Engineering, General	Yes	169	142	123	-27
500901	Music, General		208	181	120	-27
511602	Nursing Administration (MSN, MS, PhD)		28	1	0	-28
520204	Office Management and Supervision		51	21	0	-30
131001	Special Education and Teaching, General		199	169	161	-30
131209	Kindergarten/Preschool Education and Teaching		32	1	0	-31
390401	Religious Education		43	12	0	-31
150612	Industrial Technology/Technician	Yes	56	24	0	-32
512306	Occupational Therapy/Therapist		34	1	0	-32
143501	Industrial Engineering	Yes	42	8	0	-33
231001	Speech and Rhetorical Studies		57	22	17	-35
520203	Logistics and Materials Management		143	107	66	-36
512308	Physical Therapy/Therapist		38	1	0	-36
140701	Chemical Engineering		75	39	17	-36
190704	Family Systems		43	2	0	-41
450601	Economics, General		364	319	211	-45
310301	Parks, Recreation and Leisure Facilities Management		61	14	0	-47
520299	Business Administration, Management and Operations, Other		106	55	60	-51
190402	Consumer Economics		79	26	0	-53
140101	Engineering, General	Yes	88	34	0	-53
110101	Computer and Information Sciences, General	Yes	173	118	53	-54
090701	Radio and Television		69	1	0	-68
139999	Education, Other		84	12	0	-71
520301	Accounting		718	632	576	-86
521301	Management Science, General		95	1	0	-93
141001	Electrical, Electronics and Communications Engineering	Yes	192	99	42	-94
110701	Computer Science	Yes	220	122	57	-98
090401	Journalism		200	80	0	-120
521201	Management Information Systems, General		244	117	16	-127
520101	Business/Commerce, General		389	134	0	-255
	Postbaccalaureate certificates					
131202	Elementary Education and Teaching		21	110	178	89
131206	Teacher Education, Multiple Levels		6	18	22	12
261309	Epidemiology	Yes	2	9	19	8
301401	Museology/Museum Studies		1	5	11	4
270501	Statistics, General	Yes	2	6	8	4
301101	Gerontology		3	7	8	4
130101	Education, General		2	6	11	4
130407	Community College Education		1	4	9	3
450702	Cartography		1	4	7	3
520201	Business Administration and Management, General		4	7	14	3
131203	Junior High/Intermediate/Middle School Education & Teaching		1	4	4	3
500409	Graphic Design		1	4	9	3
131305	English/Language Arts Teacher Education		1	3	5	3
142301	Nuclear Engineering	Yes	1	3	3	3
511605	Family Practice Nurse/Nurse Practitioner		1	3	3	3

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
050207	Women's Studies		1	3	2	3
510701	Health/Health Care Administration/Management		10	13	20	3
400601	Geology/Earth Science, General	Yes	1	4	6	3
511699	Nursing, Other		0	3	4	2
520701	Entrepreneurship/Entrepreneurial Studies		1	2	2	2
131322	Biology Teacher Education		0	2	2	2
131328	History Teacher Education		0	2	4	2
512299	Public Health, Other		0	2	1	2
540105	Public/Applied History and Archival Administration		0	2	2	1
131401	Teaching English as a Second or Foreign Language/ESL Language Instructor		0	1	1	1
511603	Adult Health Nurse/Nursing		0	1	1	1
131315	Reading Teacher Education		1	2	3	1
160102	Linguistics		0	1	2	1
111003	Computer and Information Systems Security	Yes	0	1	0	0
131311	Mathematics Teacher Education		0	1	0	0
511604	Nurse Anesthetist		0	1	0	0
511610	Psychiatric/Mental Health Nurse/Nursing		0	1	0	0
520301	Accounting		0	1	0	0
131205	Secondary Education and Teaching		0	1	1	0
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		2	0	0	-2
390601	Theology/Theological Studies		2	0	0	-2
131101	Counselor Education/School Counseling and Guidance Services		3	1	0	-2
130501	Educational/Instructional Media Design		3	0	1	-2
500602	Cinematography and Film/Video Production		3	0	0	-3
220302	Legal Assistant/Paralegal		38	22	45	-16
Masters degrees						
130401	Educational Leadership and Administration, General		710	1,044	1,313	334
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		102	414	617	312
520201	Business Administration and Management, General		1,357	1,654	1,775	297
131202	Elementary Education and Teaching		179	344	485	165
131205	Secondary Education and Teaching		126	250	274	124
131206	Teacher Education, Multiple Levels		91	209	314	119
511605	Family Practice Nurse/Nurse Practitioner		44	142	228	98
420601	Counseling Psychology		91	185	223	94
511617	Critical Care Nursing		18	87	141	69
440401	Public Administration		69	127	168	58
130301	Curriculum and Instruction		640	697	783	57
512306	Occupational Therapy/Therapist		40	91	136	52
110701	Computer Science	Yes	60	110	145	50
510701	Health/Health Care Administration/Management		22	72	108	50
521003	Organizational Behavior Studies		16	64	102	48
131201	Adult and Continuing Education and Teaching		19	67	116	48
520301	Accounting		173	220	257	47
131101	Counselor Education/School Counseling and Guidance Services		213	255	329	42
141001	Electrical, Electronics and Communications Engineering	Yes	83	126	145	42
511505	Marriage and Family Therapy/Counseling		20	61	91	41
511604	Nurse Anesthetist		46	87	111	40

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
510912	Physician Assistant		44	83	109	39
440701	Social Work		206	244	257	39
511603	Adult Health Nurse/Nursing		42	80	104	38
390601	Theology/Theological Studies		99	137	188	38
250101	Library Science/Librarianship		82	118	134	36
500901	Music, General		66	101	113	35
310504	Sport and Fitness Administration/Management		16	49	72	33
511401	Medical Scientist (MS, PhD)		8	41	76	33
310505	Kinesiology and Exercise Science		34	64	85	30
511609	Pediatric Nurse/Nursing		23	53	71	29
511606	Maternal/Child Health and Neonatal Nurse/Nursing		9	37	57	29
220202	Programs for Foreign Lawyers (LL.M., M.C.L.)		7	34	52	27
390401	Religious Education		9	36	25	27
300601	Systems Science and Theory		8	34	61	26
512201	Public Health, General (MPH, DPH)		62	88	106	26
421701	School Psychology		13	37	60	24
521201	Management Information Systems, General		10	33	60	23
513102	Clinical Nutrition/Nutritionist		7	29	46	22
400801	Physics, General	Yes	19	40	58	21
131210	Early Childhood Education and Teaching		14	35	34	21
131315	Reading Teacher Education		41	62	55	21
450601	Economics, General		39	59	64	20
302301	Intercultural/Multicultural and Diversity Studies		5	24	37	19
090102	Mass Communication/Media Studies		28	46	58	18
131401	Teaching English as a Second or Foreign Language/ESL Language Instructor		24	38	41	15
151501	Engineering/Industrial Management	Yes	9	23	30	14
140801	Civil Engineering, General	Yes	54	68	94	14
521101	International Business/Trade/Commerce		8	22	30	14
511610	Psychiatric/Mental Health Nurse/Nursing		21	35	43	14
511602	Nursing Administration (MSN, MS, PhD)		9	23	21	14
230101	English Language and Literature, General		120	134	144	14
131001	Special Education and Teaching, General		116	130	142	13
390699	Theological and Ministerial Studies, Other		8	22	41	13
130501	Educational/Instructional Media Design		16	29	38	13
520399	Accounting and Related Services, Other		34	47	55	13
440501	Public Policy Analysis		3	16	22	13
190706	Child Development		4	16	29	13
512299	Public Health, Other		4	16	22	12
512205	Health/Medical Physics		3	15	23	12
240101	Liberal Arts and Sciences/Liberal Studies		32	44	54	12
390602	Divinity/Ministry (BD, MDiv.)		2	14	8	11
500702	Fine/Studio Arts, General		16	27	35	11
160900	Romance Languages, Literatures, & Linguistics, General		3	13	20	10
540101	History, General		45	55	66	10
521005	Human Resources Development		3	13	23	10
400603	Geophysics and Seismology	Yes	2	12	25	9
131312	Music Teacher Education		8	17	17	9
142301	Nuclear Engineering	Yes	11	20	27	9
140901	Computer Engineering, General	Yes	5	14	19	9
380201	Religion/Religious Studies		27	36	40	9

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
440201	Community Organization and Advocacy		3	12	19	9
520801	Finance, General		15	23	29	9
511508	Mental Health Counseling/Counselor		2	11	6	9
141301	Engineering Science	Yes	8	16	20	8
269999	Biological and Biomedical Sciences, Other		6	15	11	8
130404	Educational, Instructional, and Curriculum Supervision		2	11	18	8
511616	Clinical Nurse Specialist		2	10	15	8
230501	Creative Writing		9	16	19	8
140501	Biomedical/Medical Engineering	Yes	28	35	32	7
131309	Technology Teacher Education/Industrial Arts Teacher Education		2	9	11	7
390702	Youth Ministry		2	9	10	7
261103	Bioinformatics	Yes	2	9	12	7
010101	Agricultural Business and Management, General	Yes	2	9	15	7
010000	Agriculture, General	Yes	4	10	19	6
450604	Development Economics and International Development		1	7	17	6
520701	Entrepreneurship/Entrepreneurial Studies		12	18	24	6
130701	International and Comparative Education		1	7	12	6
160905	Spanish Language and Literature		9	14	18	5
140201	Aerospace, Aeronautical and Astronautical Engineering	Yes	5	10	15	5
130406	Higher Education/Higher Education Administration		15	20	25	5
131303	Business Teacher Education		15	20	25	5
141901	Mechanical Engineering	Yes	53	58	67	5
131306	Foreign Language Teacher Education		7	12	19	5
141801	Materials Engineering	Yes	6	11	17	5
011101	Plant Sciences, General	Yes	8	13	13	5
140301	Agricultural/Biological Engineering and Bioengineering	Yes	4	8	12	5
131327	Health Occupations Teacher Education		1	6	6	5
310301	Parks, Recreation and Leisure Facilities Management		12	17	20	5
100203	Recording Arts Technology/Technician		1	6	3	5
520803	Banking and Financial Support Services		1	6	12	5
520208	E-Commerce/Electronic Commerce		1	6	12	4
510602	Dental Hygiene/Hygienist		1	5	3	4
420401	Community Psychology		4	8	13	4
500999	Music, Other		5	9	6	4
380101	Philosophy		17	21	25	4
131102	College Student Counseling and Personnel Services		13	16	24	3
390501	Religious/Sacred Music		2	5	7	3
451101	Sociology		23	27	24	3
260911	Oncology and Cancer Biology	Yes	1	4	6	3
500501	Drama and Dramatics/Theatre Arts, General		11	14	12	3
050207	Women's Studies		1	4	7	3
511002	Cytotechnology/Cytotechnologist		1	4	2	3
010103	Agricultural Economics	Yes	8	11	15	3
260902	Molecular Physiology	Yes	1	3	5	3
510501	Dental Clinical Sciences, General (MS, PhD)		6	8	9	3
310101	Parks, Recreation and Leisure Studies		2	4	7	3
490104	Aviation/Airway Management and Operations		2	5	7	3
131399	Teacher Education & Professional Development, Specific Subject Areas, Other		5	8	6	2
190501	Foods, Nutrition, and Wellness Studies, General		10	13	17	2
500912	Music Pedagogy		1	3	4	2

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
111099	Computer/Information Technology Services Administration & Management, Other		0	3	5	2
390701	Pastoral Studies/Counseling		1	3	6	2
260502	Microbiology, General	Yes	1	3	5	2
520601	Business/Managerial Economics		5	7	8	2
143101	Materials Science	Yes	1	3	5	2
011202	Soil Chemistry and Physics	Yes	0	2	2	2
510702	Hospital & Health Care Facilities Administration/Management		12	14	13	2
131003	Education/Teaching of Individuals with Hearing Impairments, Including Deafness		0	2	1	2
240102	General Studies		0	2	1	2
261199	Biomathematics and Bioinformatics, Other		0	2	1	2
131311	Mathematics Teacher Education		5	7	9	2
510913	Athletic Training/Trainer		17	18	26	1
260406	Cell/Cellular and Molecular Biology	Yes	0	2	2	1
521401	Marketing/Marketing Management, General		11	12	8	1
512004	Medicinal and Pharmaceutical Chemistry (MS, PhD)		1	2	2	1
390301	Missions/Missionary Studies and Missiology		0	2	3	1
540199	History, Other		0	1	1	1
131305	English/Language Arts Teacher Education		3	4	4	1
190701	Human Development and Family Studies, General		29	30	32	1
500701	Art/Art Studies, General		14	15	18	1
260806	Human/Medical Genetics	Yes	0	1	1	1
160901	French Language and Literature		5	6	10	1
110201	Computer Programming/Programmer, General	Yes	2	3	3	1
261301	Ecology	Yes	4	4	6	1
161203	Latin Language and Literature		0	1	1	0
261001	Pharmacology	Yes	0	0	1	0
150612	Industrial Technology/Technician	Yes	9	9	10	0
421801	Educational Psychology		41	42	43	0
260102	Biomedical Sciences, General	Yes	1	1	1	0
141401	Environmental/Environmental Health Engineering	Yes	16	17	14	0
513199	Dietetics and Clinical Nutrition Services, Other		1	1	0	0
059999	Area, Ethnic, Cultural, and Gender Studies, Other		3	3	2	0
260403	Anatomy	Yes	0	0	0	0
019999	Agriculture, Agriculture Operations, & Related Sciences, Other	Yes	1	1	0	0
510799	Health and Medical Administrative Services, Other		0	0	0	0
160904	Portuguese Language and Literature		1	1	0	0
050107	Latin American Studies		5	5	5	0
451001	Political Science and Government, General		14	14	11	0
260204	Molecular Biology	Yes	0	0	0	0
261101	Biometry/Biometrics	Yes	0	0	0	0
131318	Social Studies Teacher Education		0	0	0	0
260701	Zoology/Animal Biology	Yes	0	0	0	0
260910	Pathology/Experimental Pathology	Yes	0	0	0	0
450101	Social Sciences, General		0	0	0	0
260901	Physiology, General	Yes	0	0	0	0
161200	Classics & Classical Languages, Literatures, & Linguistics		2	1	2	0
130601	Educational Evaluation and Research		0	0	0	0
512310	Vocational Rehabilitation Counseling/Counselor		0	0	0	0
131099	Special Education and Teaching, Other		1	1	0	0

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
260203	Biophysics	Yes	0	0	0	0
260401	Cell/Cellular Biology and Histology	Yes	0	0	0	0
260707	Animal Physiology	Yes	0	0	0	0
521601	Taxation		2	1	0	-1
500703	Art History, Criticism and Conservation		7	6	7	-1
131316	Science Teacher Education/General Science Teacher Education		1	0	0	-1
519999	Health Professions and Related Clinical Sciences, Other		2	1	1	-1
270501	Statistics, General	Yes	11	10	11	-1
229999	Legal Professions and Studies, Other		2	1	0	-1
399999	Theology and Religious Vocations, Other		1	0	0	-1
261102	Biostatistics	Yes	3	2	0	-1
130201	Bilingual and Multilingual Education		1	0	0	-1
160104	Comparative Literature		1	0	0	-1
511607	Nurse Midwife/Nursing Midwifery		12	11	13	-1
030103	Environmental Studies	Yes	8	7	4	-1
450201	Anthropology		21	19	20	-1
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)		10	9	13	-1
010603	Ornamental Horticulture	Yes	2	0	0	-2
260301	Botany/Plant Biology	Yes	2	0	0	-2
142001	Metallurgical Engineering	Yes	2	0	0	-2
521001	Human Resources Management/Personnel Administration, General		26	25	36	-2
131322	Biology Teacher Education		2	0	0	-2
143201	Polymer/Plastics Engineering	Yes	3	2	3	-2
140101	Engineering, General	Yes	17	15	19	-2
261309	Epidemiology	Yes	7	5	0	-2
390201	Bible/Biblical Studies		28	26	22	-2
030601	Wildlife and Wildlands Science and Management	Yes	7	5	4	-2
260202	Biochemistry	Yes	4	2	1	-2
159999	Engineering Technologies/Technicians, Other		2	0	0	-2
500401	Design and Visual Communications, General		2	0	0	-2
030501	Forestry, General	Yes	5	3	4	-3
131307	Health Teacher Education		3	0	0	-3
131308	Family & Consumer Sciences/Home Economics Teacher Education		3	0	0	-3
160501	German Language and Literature		4	2	0	-3
131301	Agricultural Teacher Education		8	6	6	-3
260503	Medical Microbiology and Bacteriology	Yes	3	0	0	-3
509999	Visual and Performing Arts, Other		3	0	0	-3
131304	Driver and Safety Teacher Education		3	1	0	-3
090101	Communication Studies/Speech Communication and Rhetoric		31	28	24	-3
010901	Animal Sciences, General	Yes	5	2	1	-3
510202	Audiology/Audiologist and Hearing Sciences		11	9	2	-3
500903	Music Performance, General		4	1	1	-3
520205	Operations Management and Supervision		11	8	0	-3
190101	Family and Consumer Sciences/Human Sciences, General		11	8	2	-3
130499	Educational Administration and Supervision, Other		99	96	67	-3
400601	Geology/Earth Science, General	Yes	15	11	5	-3
011001	Food Science	Yes	5	1	0	-4
011105	Plant Protection and Integrated Pest Management	Yes	6	2	0	-4
500799	Fine Arts and Art Studies, Other		4	0	0	-4

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
450701	Geography		10	6	3	-4
160999	Romance Languages, Literatures, and Linguistics, Other		4	0	0	-4
512202	Environmental Health		5	0	0	-5
400501	Chemistry, General	Yes	28	23	22	-5
513101	Dietetics/Dietitian (RD)		5	0	0	-5
131209	Kindergarten/Preschool Education and Teaching		5	0	0	-5
520206	Non-Profit/Public/Organizational Management		16	11	2	-5
429999	Psychology, Other		34	29	25	-5
521299	Management Information Systems and Services, Other		6	0	0	-6
190402	Consumer Economics		8	2	0	-6
090401	Journalism		16	10	0	-6
309999	Multi-/Interdisciplinary Studies, Other		15	8	0	-7
140701	Chemical Engineering		16	7	5	-9
130408	Elementary & Middle School Administration/Principalship		10	0	0	-10
260101	Biology/Biological Sciences, General	Yes	55	43	42	-11
149999	Engineering, Other		19	3	0	-15
310501	Health and Physical Education, General		150	134	145	-16
449999	Public Administration and Social Service Professions, Other		20	3	0	-17
040301	City/Urban, Community and Regional Planning		20	2	0	-17
139999	Education, Other		18	0	0	-18
430103	Criminal Justice/Law Enforcement Administration		39	20	0	-20
131319	Technical Teacher Education		20	0	0	-20
510203	Speech-Language Pathology/Pathologist		29	8	0	-22
270101	Mathematics, General	Yes	65	42	22	-23
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		28	4	0	-24
110101	Computer and Information Sciences, General	Yes	28	3	0	-24
143501	Industrial Engineering	Yes	28	2	0	-25
150000	Engineering Technology, General	Yes	38	7	0	-31
420101	Psychology, General		127	93	93	-34
511611	Public Health/Community Nurse/Nursing		34	0	0	-34
512308	Physical Therapy/Therapist		48	10	0	-39
511699	Nursing, Other		43	3	0	-41
521301	Management Science, General		41	0	0	-41
510204	Audiology/Audiologist & Speech-Language		87	40	18	-47
520299	Business Administration, Management and Operations, Other		79	22	0	-57
520101	Business/Commerce, General		74	14	10	-60
511608	Nursing Science (MS, PhD)		85	5	0	-80
130101	Education, General		629	464	352	-165
	Post-Masters certificates					
130499	Educational Administration and Supervision, Other		574	1,216	1,682	642
130401	Educational Leadership and Administration, General		271	688	963	417
130301	Curriculum and Instruction		122	148	171	26
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		5	25	43	20
421701	School Psychology		1	2	4	2
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		0	2	3	1
511699	Nursing, Other		0	1	2	1
511616	Clinical Nurse Specialist		0	1	2	1

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
420101	Psychology, General		0	1	0	0
510701	Health/Health Care Administration/Management		0	1	1	0
131304	Driver and Safety Teacher Education		0	0	0	0
421801	Educational Psychology		0	0	0	0
511608	Nursing Science (MS, PhD)		2	0	0	-2
512306	Occupational Therapy/Therapist		3	1	0	-2
130404	Educational, Instructional, and Curriculum Supervision		2	0	0	-2
131101	Counselor Education/School Counseling and Guidance Services		16	14	12	-2
130501	Educational/Instructional Media Design		7	2	0	-5
130101	Education, General		39	17	0	-21
	Doctoral degrees					
512308	Physical Therapy/Therapist		66	192	276	126
139999	Education, Other		16	63	107	47
510202	Audiology/Audiologist and Hearing Sciences		13	60	103	47
511608	Nursing Science (MS, PhD)		25	66	72	41
260406	Cell/Cellular and Molecular Biology	Yes	5	24	38	19
141801	Materials Engineering	Yes	7	25	40	18
512306	Occupational Therapy/Therapist		14	31	40	17
260101	Biology/Biological Sciences, General	Yes	7	24	29	16
260911	Oncology and Cancer Biology	Yes	4	20	28	16
260502	Microbiology, General	Yes	4	20	36	16
260902	Molecular Physiology	Yes	4	19	27	15
130406	Higher Education/Higher Education Administration		13	28	43	14
110701	Computer Science	Yes	5	19	26	14
131001	Special Education and Teaching, General		3	14	25	11
400501	Chemistry, General	Yes	28	38	49	11
130401	Educational Leadership and Administration, General		83	93	119	10
140501	Biomedical/Medical Engineering	Yes	9	19	25	10
260102	Biomedical Sciences, General	Yes	2	12	20	10
302401	Neuroscience		4	13	12	9
512004	Medicinal and Pharmaceutical Chemistry (MS, PhD)		6	15	27	9
140801	Civil Engineering, General	Yes	7	15	23	8
030101	Natural Resources/Conservation, General	Yes	2	10	12	8
140101	Engineering, General	Yes	11	19	21	8
520201	Business Administration and Management, General		19	26	37	7
140701	Chemical Engineering		7	13	16	6
140901	Computer Engineering, General	Yes	1	6	8	5
143501	Industrial Engineering	Yes	1	6	8	5
141001	Electrical, Electronics and Communications Engineering	Yes	14	19	16	5
090102	Mass Communication/Media Studies		3	8	12	5
010000	Agriculture, General	Yes	1	6	9	5
399999	Theology and Religious Vocations, Other		4	9	16	5
500901	Music, General		6	10	10	4
269999	Biological and Biomedical Sciences, Other		11	15	11	4
260806	Human/Medical Genetics	Yes	1	4	5	3
230101	English Language and Literature, General		16	19	23	3
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		2	5	4	3
143101	Materials Science	Yes	1	4	4	3

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
450701	Geography		3	6	7	3
260403	Anatomy	Yes	5	8	11	3
141901	Mechanical Engineering	Yes	7	10	16	3
540101	History, General		8	11	8	3
400601	Geology/Earth Science, General	Yes	3	6	7	3
160905	Spanish Language and Literature		3	5	7	2
420401	Community Psychology		0	3	6	2
160501	German Language and Literature		1	3	6	2
141401	Environmental/Environmental Health Engineering	Yes	2	4	7	2
142701	Systems Engineering	Yes	1	3	4	2
521005	Human Resources Development		1	3	3	2
160900	Romance Languages, Literatures, and Linguistics		0	2	4	2
400603	Geophysics and Seismology	Yes	1	3	6	2
521301	Management Science, General		2	3	5	2
011001	Food Science	Yes	2	4	3	2
420901	Industrial and Organizational Psychology		4	5	10	2
131101	Counselor Education/School Counseling and Guidance Services		2	4	8	2
510701	Health/Health Care Administration/Management		1	3	4	2
440701	Social Work		4	5	5	1
140301	Agricultural/Biological Engineering and Bioengineering	Yes	1	3	4	1
440401	Public Administration		3	4	8	1
130404	Educational, Instructional, and Curriculum Supervision		0	2	4	1
261103	Bioinformatics	Yes	0	1	1	1
261301	Ecology	Yes	4	6	8	1
450201	Anthropology		6	7	7	1
390699	Theological and Ministerial Studies, Other		7	8	8	1
131210	Early Childhood Education and Teaching		0	1	1	1
030103	Environmental Studies	Yes	1	2	0	1
160101	Foreign Languages and Literatures, General		3	3	2	0
540105	Public/Applied History and Archival Administration		0	1	0	0
131311	Mathematics Teacher Education		0	0	1	0
131316	Science Teacher Education/General Science Teacher Education		0	0	1	0
310501	Health and Physical Education, General		7	7	8	0
140201	Aerospace, Aeronautical and Astronautical Engineering	Yes	1	1	0	0
131305	English/Language Arts Teacher Education		0	0	0	0
131307	Health Teacher Education		0	0	0	0
169999	Foreign Languages, Literatures, and Linguistics, Other		0	0	0	0
160104	Comparative Literature		1	1	0	0
260901	Physiology, General	Yes	2	1	0	0
131315	Reading Teacher Education		0	0	0	0
380101	Philosophy		11	11	13	-1
143201	Polymer/Plastics Engineering	Yes	2	1	0	-1
010901	Animal Sciences, General	Yes	2	2	1	-1
160901	French Language and Literature		1	0	1	-1
142001	Metallurgical Engineering	Yes	1	0	0	-1
450601	Economics, General		8	7	10	-1
309999	Multi-/Interdisciplinary Studies, Other		4	3	4	-1
260301	Botany/Plant Biology	Yes	2	1	0	-1
260701	Zoology/Animal Biology	Yes	1	0	0	-1
451101	Sociology		8	6	5	-1

CIP	Program	STEM	Average Annual Graduates Per Academic Year			Average Annual Growth 2000-08 to 2008-18
			2000–08	2008–18	2018	
521001	Human Resources Management/Personnel Administration, General		2	0	0	-1
011101	Plant Sciences, General	Yes	2	0	0	-2
110101	Computer and Information Sciences, General	Yes	2	0	0	-2
141301	Engineering Science	Yes	2	1	0	-2
451001	Political Science and Government, General		7	5	0	-2
260910	Pathology/Experimental Pathology	Yes	4	2	0	-2
420601	Counseling Psychology		8	6	5	-2
142301	Nuclear Engineering	Yes	3	1	0	-2
260204	Molecular Biology	Yes	3	0	0	-3
519999	Health Professions and Related Clinical Sciences, Other		4	1	0	-3
270101	Mathematics, General	Yes	14	11	13	-3
510204	Audiology/Audiologist & Speech-Language		7	4	0	-3
380201	Religion/Religious Studies		14	11	10	-3
520601	Business/Managerial Economics		3	0	0	-3
260401	Cell/Cellular Biology and Histology	Yes	4	0	0	-4
090101	Communication Studies/Speech Communication and Rhetoric		6	2	3	-4
260707	Animal Physiology	Yes	4	0	0	-4
130301	Curriculum and Instruction		27	23	31	-4
261001	Pharmacology	Yes	12	8	7	-4
400801	Physics, General	Yes	16	11	14	-4
420101	Psychology, General		50	41	46	-8
260202	Biochemistry	Yes	14	5	0	-9
260503	Medical Microbiology and Bacteriology	Yes	12	0	0	-11
390601	Theology/Theological Studies		13	1	0	-12
190101	Family and Consumer Sciences/Human Sciences, General		16	4	0	-12
421801	Educational Psychology		15	1	0	-14
130101	Education, General		41	14	0	-27
	First-professional degrees/certificates					
512001	Pharmacy (PharmD [USA] PharmD, BS/BPharm [Canada])		101	126	151	25
512401	Veterinary Medicine (DVM)		64	70	69	6
220101	Law (LL.B., J.D.)		481	481	493	0
511701	Optometry (OD)		115	113	110	-2
510401	Dentistry (DDS, DMD)		116	95	99	-20
390602	Divinity/Ministry (BD, MDiv.)		177	138	135	-39
511201	Medicine (MD)		381	331	320	-50

APPENDIX 3: SHARE OF 2008 AWARDS GRANTED BY PUBLIC VERSUS PRIVATE INSTITUTIONS

Appendix 3: Share of 2008 Awards Granted by Public versus Private Institutions

Academic Program Supply and Occupational Demand Projections: 2008–2018 [UT Center for Business and Economic Research]   **1 [Appendix 3]**

CIP	Program	STEM	Percentage granted by public institutions
010000	Agriculture, General	Yes	98.7
010101	Agricultural Business and Management, General	Yes	100.0
010102	Agribusiness/Agricultural Business Operations	Yes	100.0
010103	Agricultural Economics	Yes	100.0
010199	Agricultural Business and Management, Other	Yes	100.0
010601	Applied Horticulture/Horticultural Operations, General	Yes	100.0
010603	Ornamental Horticulture	Yes	100.0
010605	Landscaping and Groundskeeping	Yes	100.0
010699	Applied Horticulture/Horicultural Business Services, Other	Yes	100.0
010901	Animal Sciences, General	Yes	100.0
011001	Food Science	Yes	100.0
011101	Plant Sciences, General	Yes	100.0
011105	Plant Protection and Integrated Pest Management	Yes	100.0
011202	Soil Chemistry and Physics	Yes	100.0
030101	Natural Resources/Conservation, General	Yes	40.0
030103	Environmental Studies	Yes	91.7
030104	Environmental Science	Yes	0.0
030201	Natural Resources Management and Policy	Yes	100.0
030501	Forestry, General	Yes	100.0
030502	Forest Sciences and Biology	Yes	0.0
030601	Wildlife and Wildlands Science and Management	Yes	89.4
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)		100.0
040301	City/Urban, Community and Regional Planning		100.0
040401	Environmental Design/Architecture		100.0
050102	American/United States Studies/Civilization		0.0
050103	Asian Studies/Civilization		0.0
050104	East Asian Studies		0.0
050106	European Studies/Civilization		0.0
050107	Latin American Studies		0.0
050110	Russian Studies		0.0
050114	Western European Studies		0.0
050201	African-American/Black Studies		81.8
050207	Women's Studies		54.5
059999	Area, Ethnic, Cultural, and Gender Studies, Other		98.4
090101	Communication Studies/Speech Communication and Rhetoric		66.3
090102	Mass Communication/Media Studies		93.7
090199	Communication and Media Studies, Other		0.0
090401	Journalism		80.0
090402	Broadcast Journalism		0.0
090499	Journalism, Other		95.1
090701	Radio and Television		100.0
090702	Digital Communication and Media/Multimedia		0.0
090901	Organizational Communication, General		0.0
090902	Public Relations/Image Management		48.6
090903	Advertising		64.2
090999	Public Relations, Advertising & Applied Communication, Other		0.0
099999	Communication, Journalism, and Related Programs, Other		75.0
100105	Communications Technology/Technician		100.0
100203	Recording Arts Technology/Technician		30.0
100304	Animation, Interactive Technology, Video Graphics & Special Effects		95.7

CIP	Program	STEM	Percentage granted by public institutions
110101	Computer and Information Sciences, General	Yes	62.9
110103	Information Technology	Yes	0.0
110199	Computer and Information Sciences, Other		0.0
110202	Computer Programming, Specific Applications	Yes	100.0
110301	Data Processing and Data Processing Technology/Technician	Yes	0.0
110401	Information Science/Studies	Yes	72.7
110601	Data Entry/Microcomputer Applications, General		0.0
110699	Data Entry/Microcomputer Applications, Other		0.0
110701	Computer Science	Yes	71.8
110801	Web Page, Digital/Multimedia & Information Resources Design	Yes	8.3
110899	Computer Software and Media Applications, Other		0.0
110901	Computer Systems Networking and Telecommunications	Yes	21.6
111001	System Administration/Administrator	Yes	0.0
111002	System, Networking, and LAN/WAN Management/Manager	Yes	100.0
111003	Computer and Information Systems Security	Yes	1.1
111004	Web/Multimedia Management and Webmaster	Yes	0.0
111099	Computer/Info Technology Services Administration & Management, Other		100.0
119999	Computer and Information Sciences & Support Services, Other		0.0
120301	Funeral Service and Mortuary Science, General		0.0
120401	Cosmetology/Cosmetologist, General		0.0
120406	Make-Up Artist/Specialist		0.0
120409	Aesthetician/Esthetician and Skin Care Specialist		0.0
120410	Nail Technician/Specialist and Manicurist		0.0
120499	Cosmetology and Related Personal Grooming Arts, Other		0.0
120503	Culinary Arts/Chef Training		70.4
130101	Education, General		49.8
130301	Curriculum and Instruction		61.5
130401	Educational Leadership and Administration, General		65.5
130404	Educational, Instructional, and Curriculum Supervision		0.0
130406	Higher Education/Higher Education Administration		6.3
130499	Educational Administration and Supervision, Other		0.0
130501	Educational/Instructional Media Design		100.0
130701	International and Comparative Education		0.0
131001	Special Education and Teaching, General		54.8
131003	Education/Teaching of Individuals with Hearing Impairments incl. Deafness		0.0
131015	Education/Teaching of Individuals in Early Childhood Special Educ Programs		0.0
131099	Special Education and Teaching, Other		0.0
131101	Counselor Education/School Counseling and Guidance Services		72.3
131102	College Student Counseling and Personnel Services		100.0
131201	Adult and Continuing Education and Teaching		0.0
131202	Elementary Education and Teaching		16.2
131203	Junior High/Intermediate/Middle School Education & Teaching		69.2
131205	Secondary Education and Teaching		41.8
131206	Teacher Education, Multiple Levels		68.1
131209	Kindergarten/Preschool Education and Teaching		0.0
131210	Early Childhood Education and Teaching		63.8
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		69.4
131301	Agricultural Teacher Education		100.0
131302	Art Teacher Education		64.0
131303	Business Teacher Education		97.0

CIP	Program	STEM	Percentage granted by public institutions
131305	English/Language Arts Teacher Education		56.0
131306	Foreign Language Teacher Education		100.0
131307	Health Teacher Education		90.6
131308	Family & Consumer Sciences/Home Economics Teacher Education		25.0
131309	Technology Teacher Education/Industrial Arts Teacher Education		46.2
131311	Mathematics Teacher Education		35.5
131312	Music Teacher Education		8.6
131314	Physical Education Teaching and Coaching		6.8
131315	Reading Teacher Education		66.7
131316	Science Teacher Education/General Science Teacher Education		100.0
131318	Social Studies Teacher Education		88.5
131319	Technical Teacher Education		100.0
131322	Biology Teacher Education		12.5
131324	Drama and Dance Teacher Education		0.0
131325	French Language Teacher Education		0.0
131327	Health Occupations Teacher Education		0.0
131328	History Teacher Education		19.5
131330	Spanish Language Teacher Education		16.7
131332	Geography Teacher Education		0.0
131335	Psychology Teacher Education		0.0
131399	Teacher Education & Professional Development, Specific Subject Areas, Other		90.9
131401	Teaching English as a Second or Foreign Language/ESL Language Instructor		3.8
139999	Education, Other		0.0
140101	Engineering, General	Yes	96.9
140201	Aerospace, Aeronautical and Astronautical Engineering	Yes	100.0
140301	Agricultural/Biological Engineering and Bioengineering	Yes	100.0
140401	Architectural Engineering	Yes	100.0
140501	Biomedical/Medical Engineering	Yes	14.2
140701	Chemical Engineering		54.9
140801	Civil Engineering, General	Yes	75.6
140901	Computer Engineering, General	Yes	78.3
141001	Electrical, Electronics and Communications Engineering	Yes	74.9
141101	Engineering Mechanics	Yes	0.0
141301	Engineering Science	Yes	55.8
141401	Environmental/Environmental Health Engineering	Yes	73.9
141801	Materials Engineering	Yes	100.0
141901	Mechanical Engineering	Yes	71.4
142301	Nuclear Engineering	Yes	100.0
142701	Systems Engineering		100.0
143101	Materials Science	Yes	0.0
143201	Polymer/Plastics Engineering	Yes	100.0
143501	Industrial Engineering	Yes	100.0
149999	Engineering, Other		0.0
150000	Engineering Technology, General	Yes	100.0
150101	Architectural Engineering Technology/Technician	Yes	100.0
150201	Civil Engineering Technology/Technician	Yes	100.0
150303	Electrical, Electronic & Communications Engineering Technology/Technician	Yes	47.5
150399	Electrical & Electronic Engineering Technologies/Technicians, Other		0.0
150501	Heating, Air Conditioning & Refrigeration Technology/Technician (ACH/ACR/ACHR/HRAC/HVAC/AC Technology)	Yes	0.0

CIP	Program	STEM	Percentage granted by public institutions
150612	Industrial Technology/Technician	Yes	100.0
150613	Manufacturing Technology/Technician	Yes	100.0
150702	Quality Control Technology/Technician	Yes	100.0
150801	Aeronautical/Aerospace Engineering Technology/Technician	Yes	100.0
150805	Mechanical Engineering/Mechanical Technology/Technician	Yes	100.0
151102	Surveying Technology/Surveying	Yes	100.0
151201	Computer Engineering Technology/Technician	Yes	100.0
151202	Computer Technology/Computer Systems Technology	Yes	76.5
151301	Drafting and Design Technology/Technician, General	Yes	100.0
151302	CAD/CADD Drafting and/or Design Technology/Technician	Yes	0.0
151303	Architectural Drafting and Architectural CAD/CADD	Yes	0.0
151306	Mechanical Drafting and Mechanical Drafting CAD/CADD	Yes	100.0
151501	Engineering/Industrial Management	Yes	100.0
160101	Foreign Languages and Literatures, General		96.8
160104	Comparative Literature		0.0
160402	Russian Language and Literature		16.7
160501	German Language and Literature		13.5
160900	Romance Languages, Literatures, & Linguistics, General		88.9
160901	French Language and Literature		43.1
160902	Italian Language and Literature		100.0
160904	Portuguese Language and Literature		0.0
160905	Spanish Language and Literature		25.3
161103	Ancient Near Eastern & Biblical Languages, Literatures, & Linguistics		0.0
161200	Classics & Classical Languages, Literatures, & Linguistics, General		37.8
161203	Latin Language and Literature		0.0
161601	American Sign Language (ASL)		0.0
161603	Sign Language Interpretation and Translation		40.0
190000	Work and Family Studies		0.0
190101	Family and Consumer Sciences/Human Sciences, General		99.0
190203	Consumer Merchandising/Retailing Management		0.0
190401	Family Resource Management Studies, General		100.0
190402	Consumer Economics		100.0
190403	Consumer Services and Advocacy		0.0
190501	Foods, Nutrition, and Wellness Studies, General		100.0
190505	Foodservice Systems Administration/Management		100.0
190701	Human Development and Family Studies, General		85.2
190704	Family Systems		28.6
190706	Child Development		86.9
190799	Human Development, Family Studies, & Related Services, Other		100.0
190901	Apparel and Textiles, General		95.7
220000	Legal Studies, General		0.0
220001	Pre-Law Studies		0.0
220101	Law (LL.B., J.D.)		54.9
220202	Programs for Foreign Lawyers (LL.M., M.C.L.)		0.0
220302	Legal Assistant/Paralegal		52.7
220303	Court Reporting/Court Reporter		100.0
230101	English Language and Literature, General		61.7
230501	Creative Writing		60.0
231001	Speech and Rhetorical Studies		52.6
231101	Technical and Business Writing		14.3

CIP	Program	STEM	Percentage granted by public institutions
239999	English Language and Literature/Letters, Other		0.0
240101	Liberal Arts and Sciences/Liberal Studies		97.7
240102	General Studies		95.4
240103	Humanities/Humanistic Studies		20.0
240199	Liberal Arts & Sciences, General Studies & Humanities, Other		76.2
250101	Library Science/Librarianship		68.8
250301	Library Assistant/Technician		100.0
260101	Biology/Biological Sciences, General	Yes	65.0
260102	Biomedical Sciences, General	Yes	46.7
260202	Biochemistry	Yes	13.5
260203	Biophysics	Yes	0.0
260204	Molecular Biology	Yes	0.0
260210	Biochemistry/Biophysics and Molecular Biology	Yes	0.0
260301	Botany/Plant Biology		100.0
260403	Anatomy		100.0
260406	Cell/Cellular and Molecular Biology	Yes	0.0
260502	Microbiology, General	Yes	0.0
260503	Medical Microbiology and Bacteriology	Yes	100.0
260701	Zoology/Animal Biology	Yes	0.0
260806	Human/Medical Genetics	Yes	0.0
260902	Molecular Physiology	Yes	0.0
260910	Pathology/Experimental Pathology	Yes	0.0
260911	Oncology and Cancer Biology	Yes	0.0
261001	Pharmacology	Yes	0.0
261103	Bioinformatics	Yes	0.0
261199	Biomathematics and Bioinformatics, Other		100.0
261201	Biotechnology	Yes	100.0
261301	Ecology	Yes	100.0
261305	Environmental Biology	Yes	0.0
261309	Epidemiology	Yes	100.0
261399	Ecology, Evolution, Systematics & Population Biology, Other		0.0
269999	Biological and Biomedical Sciences, Other		67.6
270101	Mathematics, General	Yes	50.4
270301	Applied Mathematics	Yes	100.0
270501	Statistics, General	Yes	100.0
300101	Biological and Physical Sciences		100.0
300601	Systems Science and Theory		100.0
300801	Mathematics and Computer Science		0.0
301101	Gerontology		100.0
301401	Museology/Museum Studies		33.3
301501	Science, Technology and Society		0.0
301701	Behavioral Sciences		0.0
302001	International/Global Studies		31.8
302202	Classical, Ancient Mediterranean & Near Eastern Studies & Archaeology		0.0
302301	Intercultural/Multicultural and Diversity Studies		0.0
302401	Neuroscience		0.0
302501	Cognitive Science		0.0
309999	Multi-/Interdisciplinary Studies, Other		83.3
310101	Parks, Recreation and Leisure Studies		0.0
310301	Parks, Recreation and Leisure Facilities Management		100.0

CIP	Program	STEM	Percentage granted by public institutions
310501	Health and Physical Education, General		80.5
310504	Sport and Fitness Administration/Management		66.0
310505	Kinesiology and Exercise Science		73.1
310599	Health and Physical Education/Fitness, Other		0.0
319999	Parks, Recreation, Leisure and Fitness Studies, Other		0.0
320101	Basic Skills, General		100.0
380101	Philosophy		50.9
380103	Ethics		0.0
380201	Religion/Religious Studies		3.0
380203	Christian Studies.		0.0
380299	Religion/Religious Studies, Other		0.0
389999	Philosophy and Religious Studies, Other		47.6
390201	Bible/Biblical Studies		0.0
390301	Missions/Missionary Studies and Missiology		0.0
390401	Religious Education		0.0
390501	Religious/Sacred Music		0.0
390601	Theology/Theological Studies		0.0
390602	Divinity/Ministry (BD, MDiv.)		0.0
390604	Pre-Theology/Pre-Ministerial Studies		0.0
390699	Theological and Ministerial Studies, Other		0.0
390701	Pastoral Studies/Counseling		0.0
390702	Youth Ministry		0.0
390799	Pastoral Counseling and Specialized Ministries, Other		0.0
399999	Theology and Religious Vocations, Other		0.0
400101	Physical Sciences	Yes	0.0
400501	Chemistry, General	Yes	72.3
400599	Chemistry, Other		0.0
400601	Geology/Earth Science, General	Yes	81.8
400801	Physics, General	Yes	48.0
410301	Chemical Technology/Technician	Yes	100.0
419999	Science Technologies/Technicians, Other		100.0
420101	Psychology, General		68.5
420401	Community Psychology		0.0
420601	Counseling Psychology		5.0
420701	Developmental and Child Psychology		0.0
420901	Industrial and Organizational Psychology		100.0
421101	Physiological Psychology/Psychobiology		0.0
421701	School Psychology		61.5
421801	Educational Psychology		100.0
429999	Psychology, Other		0.0
430103	Criminal Justice/Law Enforcement Administration		71.5
430104	Criminal Justice/Safety Studies		0.0
430107	Criminal Justice/Police Science		100.0
430112	Securities Services Administration/Management		100.0
430199	Corrections and Criminal Justice, Other		0.0
430203	Fire Science/Firefighting		100.0
439999	Security and Protective Services, Other		100.0
440000	Human Services, General		47.6
440201	Community Organization and Advocacy		89.4
440401	Public Administration		65.0

CIP	Program	STEM	Percentage granted by public institutions
440501	Public Policy Analysis		0.0
440701	Social Work		82.5
449999	Public Administration and Social Service Professions, Other		47.4
450101	Social Sciences, General		0.0
450201	Anthropology		69.9
450301	Archeology		0.0
450601	Economics, General		25.1
450605	International Economics		0.0
450699	Economics, Other		0.0
450701	Geography		100.0
450702	Cartography		100.0
450901	International Relations and Affairs		59.4
451001	Political Science and Government, General		64.5
451101	Sociology		69.9
451201	Urban Studies/Affairs		0.0
459999	Social Sciences, Other		100.0
460302	Electrician		58.8
470000	Mechanics and Repairers, General		100.0
470101	Electrical/Electronics Equipment Installation & Repair, General		100.0
470104	Computer Installation and Repair Technology/Technician		0.0
470201	Heating, AC, Ventilation & Refrigeration Maintenance Technology/Technician		16.1
470302	Heavy Equipment Maintenance Technology/Technician		0.0
470303	Industrial Mechanics and Maintenance Technology		100.0
470399	Heavy/Industrial Equipment Maintenance Technologies, Other		0.0
470603	Autobody/Collision and Repair Technology/Technician		0.0
470604	Automobile/Automotive Mechanics Technology/Technician		6.0
470605	Diesel Mechanics Technology/Technician		0.0
470607	Airframe Mechanics & Aircraft Maintenance Technology/Technician		0.0
470608	Aircraft Powerplant Technology/Technician		0.0
470609	Avionics Maintenance Technology/Technician		0.0
470613	Medium/Heavy Vehicle and Truck Technology/Technician		0.0
470614	Alternative Fuel Vehicle Technology/Technician		0.0
470615	Engine Machinist		0.0
470699	Vehicle Maintenance and Repair Technologies, Other.		0.0
479999	Mechanic and Repair Technologies/Technicians, Other		15.3
480501	Machine Tool Technology/Machinist		0.0
480503	Machine Shop Technology/Assistant		100.0
480508	Welding Technology/Welder		36.7
490101	Aeronautics/Aviation/Aerospace Science & Technology, General		100.0
490104	Aviation/Airway Management and Operations		100.0
500101	Visual and Performing Arts, General		50.0
500401	Design and Visual Communications, General		0.0
500402	Commercial and Advertising Art		51.2
500406	Commercial Photography		0.0
500408	Interior Design		46.8
500409	Graphic Design		0.0
500501	Drama and Dramatics/Theatre Arts, General		78.8
500502	Technical Theatre/Theatre Design and Technology		0.0
500506	Acting		0.0
500508	Theatre/Theatre Arts Management		0.0

CIP	Program	STEM	Percentage granted by public institutions
500601	Film/Cinema Studies		0.0
500602	Cinematography and Film/Video Production		26.1
500605	Photography		53.6
500701	Art/Art Studies, General		79.7
500702	Fine/Studio Arts, General		37.6
500703	Art History, Criticism and Conservation		60.0
500708	Painting		0.0
500901	Music, General		83.8
500903	Music Performance, General		0.0
500904	Music Theory and Composition		0.0
500907	Piano and Organ		0.0
500908	Voice and Opera		0.0
500909	Music Management and Merchandising		52.2
500911	Violin, Viola, Guitar and Other Stringed Instruments		0.0
500912	Music Pedagogy		0.0
500999	Music, Other		52.3
510000	Health Services/Allied Health/Health Sciences, General		0.0
510201	Communication Disorders, General		0.0
510202	Audiology/Audiologist and Hearing Sciences		75.0
510203	Speech-Language Pathology/Pathologist		89.7
510204	Audiology/Audiologist & Speech-Language Pathology/Pathologist		86.3
510299	Communication Disorders Sciences and Services, Other		0.0
510401	Dentistry (DDS, DMD)		59.2
510501	Dental Clinical Sciences, General (MS, PhD)		100.0
510601	Dental Assisting/Assistant		14.6
510602	Dental Hygiene/Hygienist		98.6
510701	Health/Health Care Administration/Management		22.7
510702	Hospital & Health Care Facilities Administration/Management		38.9
510705	Medical Office Management/Administration		0.0
510706	Health Information/Medical Records Administration/Administrator		23.8
510707	Health Information/Medical Records Technology/Technician		36.6
510708	Medical Transcription/Transcriptionist		100.0
510710	Medical Office Assistant/Specialist		0.0
510713	Medical Insurance Coding Specialist/Coder		3.4
510714	Medical Insurance Specialist/Medical Biller		0.0
510716	Medical Administrative/Executive Assistant & Medical Secretary		0.0
510799	Health and Medical Administrative Services, Other		4.0
510801	Medical/Clinical Assistant		0.0
510803	Occupational Therapist Assistant		100.0
510805	Pharmacy Technician/Assistant		15.8
510806	Physical Therapist Assistant		94.0
510808	Veterinary/Animal Health Technology/Technician & Veterinary Assistant		71.1
510812	Respiratory Therapy Technician/Assistant		0.0
510899	Allied Health and Medical Assisting Services, Other		0.0
510901	Cardiovascular Technology/Technologist		100.0
510904	Emergency Medical Technology/Technician (EMT Paramedic)		100.0
510905	Nuclear Medical Technology/Technologist		73.5
510907	Medical Radiologic Technology/Science - Radiation Therapist		57.5
510908	Respiratory Care Therapy/Therapist		65.9
510909	Surgical Technology/Technologist		14.3

CIP	Program	STEM	Percentage granted by public institutions
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician		77.8
510911	Radiologic Technology/Science - Radiographer		0.0
510912	Physician Assistant		0.0
510913	Athletic Training/Trainer		50.0
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other		100.0
511001	Blood Bank Technology Specialist		100.0
511002	Cytotechnology/Cytotechnologist		100.0
511004	Clinical/Medical Laboratory Technician		54.0
511005	Clinical Laboratory Science/Medical Technology/Technologist		48.4
511009	Phlebotomy/Phlebotomist		0.0
511099	Clinical/Medical Laboratory Science & Allied Professions, Other		100.0
511102	Pre-Medicine/Pre-Medical Studies		0.0
511103	Pre-Pharmacy Studies		0.0
511105	Pre-Nursing Studies		0.0
511199	Health/Medical Preparatory Programs, Other		29.2
511201	Medicine (MD)		52.8
511401	Medical Scientist (MS, PhD)		0.0
511501	Substance Abuse/Addiction Counseling		100.0
511505	Marriage and Family Therapy/Counseling		0.0
511508	Mental Health Counseling/Counselor		0.0
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)		62.8
511602	Nursing Administration (MSN, MS, PhD)		0.0
511603	Adult Health Nurse/Nursing		3.1
511604	Nurse Anesthetist		1.4
511605	Family Practice Nurse/Nurse Practitioner		5.1
511606	Maternal/Child Health and Neonatal Nurse/Nursing		0.0
511607	Nurse Midwife/Nursing Midwifery		0.0
511608	Nursing Science (MS, PhD)		92.0
511609	Pediatric Nurse/Nursing		0.0
511610	Psychiatric/Mental Health Nurse/Nursing		3.7
511616	Clinical Nurse Specialist		0.0
511617	Critical Care Nursing		0.0
511699	Nursing, Other		2.5
511701	Optometry (OD)		0.0
511801	Opticianry/Ophthalmic Dispensing Optician		100.0
511803	Opthalmic Technician/Technologist		100.0
512001	Pharmacy (PharmD [USA] PharmD, BS/BPharm [Canada])		100.0
512004	Medicinal and Pharmaceutical Chemistry (MS, PhD)		100.0
512201	Public Health, General (MPH, DPH)		79.8
512202	Environmental Health		100.0
512205	Health/Medical Physics		0.0
512299	Public Health, Other		100.0
512301	Art Therapy/Therapist		0.0
512306	Occupational Therapy/Therapist		29.3
512308	Physical Therapy/Therapist		75.4
512401	Veterinary Medicine (DVM)		100.0
512501	Veterinary Sciences/Veterinary Clinical Sciences, General (Cert, MS, PhD)		0.0
512602	Home Health Aide/Home Attendant		0.0
513101	Dietetics/Dietitian (RD)		0.0
513102	Clinical Nutrition/Nutritionist		100.0

CIP	Program	STEM	Percentage granted by public institutions
513104	Dietitian Assistant		100.0
513501	Massage Therapy/Therapeutic Massage		5.5
519999	Health Professions and Related Clinical Sciences, Other		76.4
520101	Business/Commerce, General		50.0
520201	Business Administration and Management, General		48.3
520203	Logistics and Materials Management		100.0
520204	Office Management and Supervision		100.0
520205	Operations Management and Supervision		0.0
520206	Non-Profit/Public/Organizational Management		50.0
520208	E-Commerce/Electronic Commerce		0.0
520299	Business Administration, Management and Operations, Other		16.9
520301	Accounting		64.3
520302	Accounting Technology/Technician and Bookkeeping		88.7
520304	Accounting and Finance		0.0
520305	Accounting and Business/Management		0.0
520399	Accounting and Related Services, Other		100.0
520401	Administrative Assistant and Secretarial Science, General		87.8
520407	Business/Office Automation/Technology/Data Entry		100.0
520408	General Office Occupations and Clerical Services		0.0
520601	Business/Managerial Economics		84.1
520701	Entrepreneurship/Entrepreneurial Studies		90.9
520799	Entrepreneurial and Small Business Operations, Other		0.0
520801	Finance, General		84.2
520803	Banking and Financial Support Services		0.0
520904	Hotel/Motel Administration/Management		100.0
521001	Human Resources Management/Personnel Administration, General		26.7
521003	Organizational Behavior Studies		0.0
521005	Human Resources Development		0.0
521101	International Business/Trade/Commerce		66.1
521201	Management Information Systems, General		86.2
521301	Management Science, General		23.8
521304	Actuarial Science	Yes	0.0
521401	Marketing/Marketing Management, General		80.3
521501	Real Estate		100.0
521801	Sales, Distribution, and Marketing Operations, General		75.0
521804	Selling Skills and Sales Operations		100.0
521902	Fashion Merchandising		0.0
522001	Construction Management		100.0
529999	Business, Management, Marketing, & Related Support Services, Other		87.5
540101	History, General		56.8
540105	Public/Applied History and Archival Administration		100.0
540199	History, Other		8.3

APPENDIX 4: AWARD CATEGORIES PROJECTED TO PRODUCE NO GRADUATES IN 2018

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
	Doctoral degrees			
130101	Education, General		41	14
190101	Family and Consumer Sciences/Human Sciences, General		16	4
421801	Educational Psychology		15	1
260202	Biochemistry	Yes	14	5
390601	Theology/Theological Studies		13	1
260503	Medical Microbiology and Bacteriology (NEW)	Yes	12	0
510204	Audiology/Audiologist & Speech-Language Pathology/Pathologist		7	4
451001	Political Science and Government, General		7	5
260910	Pathology/Experimental Pathology (NEW)	Yes	4	2
519999	Health Professions and Related Clinical Sciences, Other		4	1
260707	Animal Physiology (NEW)	Yes	4	0
260401	Cell/Cellular Biology and Histology	Yes	4	0
520601	Business/Managerial Economics		3	0
142301	Nuclear Engineering	Yes	3	1
260204	Molecular Biology	Yes	3	0
141301	Engineering Science	Yes	2	1
260301	Botany/Plant Biology	Yes	2	1
143201	Polymer/Plastics Engineering	Yes	2	1
260901	Physiology, General (NEW)	Yes	2	1
011101	Plant Sciences, General	Yes	2	0
110101	Computer and Information Sciences, General	Yes	2	0
521001	Human Resources Management/Personnel Administration, General		2	0
030103	Environmental Studies (NEW)	Yes	1	2
140201	Aerospace, Aeronautical and Astronautical Engineering	Yes	1	1
260701	Zoology/Animal Biology	Yes	1	0
160104	Comparative Literature		1	1
142001	Metallurgical Engineering	Yes	1	0
131315	Reading Teacher Education		0	0
131305	English/Language Arts Teacher Education		0	0
131307	Health Teacher Education		0	0
169999	Foreign Languages, Literatures, and Linguistics, Other		0	0
540105	Public/Applied History and Archival Administration		0	1
	Masters degrees			
511608	Nursing Science (MS, PhD)		85	5
520299	Business Administration, Management and Operations, Other		79	22
512308	Physical Therapy/Therapist		48	10
511699	Nursing, Other		43	3
521301	Management Science, General		41	0
430103	Criminal Justice/Law Enforcement Administration		39	20
150000	Engineering Technology, General	Yes	38	7
511611	Public Health/Community Nurse/Nursing		34	0
510203	Speech-Language Pathology/Pathologist		29	8
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		28	4
143501	Industrial Engineering (NEW)	Yes	28	2
110101	Computer and Information Sciences, General	Yes	28	3
131319	Technical Teacher Education		20	0
449999	Public Administration and Social Service Professions, Other		20	3

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
Masters degrees (continued)				
040301	City/Urban, Community and Regional Planning		20	2
149999	Engineering, Other		19	3
139999	Education, Other		18	0
090401	Journalism		16	10
309999	Multi-/Interdisciplinary Studies, Other		15	8
520205	Operations Management and Supervision		11	8
130408	Elementary & Middle School Administration/Principalship (NEW)		10	0
190402	Consumer Economics		8	2
261309	Epidemiology	Yes	7	5
521299	Management Information Systems and Services, Other		6	0
011105	Plant Protection and Integrated Pest Management	Yes	6	2
011001	Food Science	Yes	5	1
512202	Environmental Health		5	0
131209	Kindergarten/Preschool Education and Teaching (NEW)		5	0
513101	Dietetics/Dietitian (RD)		5	0
160501	German Language and Literature		4	2
160999	Romance Languages, Literatures, and Linguistics, Other		4	0
500799	Fine Arts and Art Studies, Other		4	0
131304	Driver and Safety Teacher Education		3	1
260503	Medical Microbiology and Bacteriology (NEW)	Yes	3	0
131308	Family & Consumer Sciences/Home Economics Teacher Education		3	0
509999	Visual and Performing Arts, Other		3	0
261102	Biostatistics	Yes	3	2
131307	Health Teacher Education		3	0
500401	Design and Visual Communications, General		2	0
229999	Legal Professions and Studies, Other (NEW)		2	1
159999	Engineering Technologies/Technicians, Other		2	0
131322	Biology Teacher Education		2	0
142001	Metallurgical Engineering	Yes	2	0
010603	Ornamental Horticulture	Yes	2	0
260301	Botany/Plant Biology	Yes	2	0
521601	Taxation		2	1
513199	Dietetics and Clinical Nutrition Services, Other (NEW)		1	1
130201	Bilingual and Multilingual Education		1	0
160104	Comparative Literature		1	0
131099	Special Education and Teaching, Other		1	1
399999	Theology and Religious Vocations, Other		1	0
019999	Agriculture, Agriculture Operations, & Related Sciences, Other	Yes	1	1
131316	Science Teacher Education/General Science Teacher Education		1	0
160904	Portuguese Language and Literature		1	1
260203	Biophysics	Yes	0	0
260401	Cell/Cellular Biology and Histology	Yes	0	0
260707	Animal Physiology (NEW)	Yes	0	0
260901	Physiology, General (NEW)	Yes	0	0
261101	Biometry/Biometrics	Yes	0	0
510799	Health and Medical Administrative Services, Other		0	0
130601	Educational Evaluation and Research		0	0
260204	Molecular Biology	Yes	0	0

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
Masters degrees (continued)				
260403	Anatomy	Yes	0	0
512310	Vocational Rehabilitation Counseling/Counselor		0	0
131318	Social Studies Teacher Education		0	0
260701	Zoology/Animal Biology	Yes	0	0
260910	Pathology/Experimental Pathology (NEW)	Yes	0	0
450101	Social Sciences, General		0	0
Bachelor's degrees				
520101	Business/Commerce, General		389	134
090401	Journalism		200	80
521301	Management Science, General		95	1
140101	Engineering, General	Yes	88	34
139999	Education, Other		84	12
190402	Consumer Economics		79	26
090701	Radio and Television		69	1
310301	Parks, Recreation and Leisure Facilities Management		61	14
150612	Industrial Technology/Technician (NEW)	Yes	56	24
520204	Office Management and Supervision		51	21
190704	Family Systems		43	2
390401	Religious Education		43	12
143501	Industrial Engineering (NEW)	Yes	42	8
459999	Social Sciences, Other		39	13
512308	Physical Therapy/Therapist		38	1
512306	Occupational Therapy/Therapist		34	1
131209	Kindergarten/Preschool Education and Teaching (NEW)		32	1
131319	Technical Teacher Education		31	6
511602	Nursing Administration (MSN, MS, PhD)		28	1
440201	Community Organization and Advocacy		28	2
030103	Environmental Studies (NEW)	Yes	27	1
010603	Ornamental Horticulture	Yes	27	0
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other		27	0
510701	Health/Health Care Administration/Management		25	9
399999	Theology and Religious Vocations, Other		25	4
520205	Operations Management and Supervision		19	9
150399	Electrical & Electronic Engineering Technologies/Technicians, Other		18	0
390301	Missions/Missionary Studies and Missiology		16	5
390699	Theological and Ministerial Studies, Other		14	0
512202	Environmental Health		14	0
510204	Audiology/Audiologist & Speech-Language Pathology/Pathologist		13	0
050102	American/United States Studies/Civilization		13	2
510905	Nuclear Medical Technology/Technologist		12	4
511608	Nursing Science (MS, PhD)		12	0
269999	Biological and Biomedical Sciences, Other		12	5
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician		11	3
520401	Administrative Assistant and Secretarial Science, General		10	1
521804	Selling Skills and Sales Operations		10	1
520803	Banking and Financial Support Services		10	0
430199	Corrections and Criminal Justice, Other		9	1
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other		9	0

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
Bachelor's degrees (continued)				
511102	Pre-Medicine/Pre-Medical Studies		9	3
529999	Business, Management, Marketing, & Related Support Services, Other		9	0
260499	Cell/Cellular Biology and Anatomical Sciences, Other		9	6
131399	Teacher Education & Professional Development, Specific Subject Areas, Other		8	0
150801	Aeronautical/Aerospace Engineering Technology/Technician	Yes	8	5
131322	Biology Teacher Education		8	1
521499	Marketing, Other		8	0
500902	Music History, Literature, and Theory		8	0
260503	Medical Microbiology and Bacteriology (NEW)	Yes	7	0
420301	Cognitive Psychology and Psycholinguistics		7	1
131309	Technology Teacher Education/Industrial Arts Teacher Education		7	0
521501	Real Estate		7	0
019999	Agriculture, Agriculture Operations, & Related Sciences, Other	Yes	6	6
159999	Engineering Technologies/Technicians, Other		6	6
500799	Fine Arts and Art Studies, Other		6	0
150507	Environmental Engineering Technology/Environmental Technology	Yes	5	0
230401	English Composition		5	0
521099	Human Resources Management and Services, Other		5	0
511002	Cytotechnology/Cytotechnologist		5	0
030599	Forestry, Other	Yes	4	0
150101	Architectural Engineering Technology/Technician	Yes	4	0
450699	Economics, Other		4	1
511004	Clinical/Medical Laboratory Technician		3	0
190601	Housing and Human Environments, General		3	0
520901	Hospitality Administration/Management, General		3	0
010101	Agricultural Business and Management, General	Yes	2	0
500599	Dramatic/Theatre Arts and Stagecraft, Other		2	0
450401	Criminology		2	0
511104	Pre-Veterinary Studies		2	0
161203	Latin Language and Literature		2	1
260701	Zoology/Animal Biology	Yes	2	0
521701	Insurance		2	0
110199	Computer and Information Sciences, Other (NEW)		1	2
509999	Visual and Performing Arts, Other		1	0
111099	Computer/Information Technology Services Administration & Management, Other (NEW)		1	1
513199	Dietetics and Clinical Nutrition Services, Other (NEW)		1	2
450299	Anthropology, Other (NEW)		1	1
131310	Sales & Marketing Operations/Marketing & Distribution Teacher Education		1	0
301401	Museology/Museum Studies		1	1
512399	Rehabilitation and Therapeutic Professions, Other		1	0
521304	Actuarial Science	Yes	1	1
131011	Education/Teaching of Individuals with Specific Learning Disabilities		1	1
511503	Clinical/Medical Social Work		1	0
149999	Engineering, Other		1	0
301301	Medieval and Renaissance Studies		1	0
500912	Music Pedagogy (NEW)		1	1
260301	Botany/Plant Biology	Yes	1	0
419999	Science Technologies/Technicians, Other		1	0

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
Bachelor's degrees (continued)				
161299	Classics & Classical Languages, Literatures, & Linguistics, Other		0	0
131012	Education/Teaching of Individuals with Speech or Language Impairments		0	0
131323	Chemistry Teacher Education		0	0
190499	Family and Consumer Economics and Related Services, Other		0	0
190599	Foods, Nutrition, and Related Services, Other		0	0
131326	German Language Teacher Education		0	0
150805	Mechanical Engineering/Mechanical Technology/Technician	Yes	0	0
261301	Ecology	Yes	0	0
400899	Physics, Other		0	0
512207	Public Health Education and Promotion		0	0
512305	Music Therapy/Therapist		0	0
110899	Computer Software and Media Applications, Other (NEW)		0	1
239999	English Language and Literature/Letters, Other		0	1
410101	Biology Technician/Biotechnology Laboratory Technician	Yes	0	0
500502	Technical Theatre/Theatre Design and Technology		0	1
510912	Physician Assistant		0	0
511101	Pre-Dentistry Studies		0	0
520304	Accounting and Finance (NEW)		0	1
Associate degrees				
521201	Management Information Systems, General		216	44
150399	Electrical & Electronic Engineering Technologies/Technicians, Other		116	3
110101	Computer and Information Sciences, General	Yes	89	4
151301	Drafting and Design Technology/Technician, General	Yes	78	1
110103	Information Technology (NEW)	Yes	75	73
520101	Business/Commerce, General		47	22
119999	Computer and Information Sciences & Support Services, Other		44	11
151201	Computer Engineering Technology/Technician	Yes	27	2
110401	Information Science/Studies	Yes	25	9
110701	Computer Science	Yes	24	0
110201	Computer Programming/Programmer, General	Yes	21	0
510716	Medical Administrative/Executive Assistant & Medical Secretary		20	0
150201	Civil Engineering Technology/Technician	Yes	14	4
161603	Sign Language Interpretation and Translation		12	2
151399	Drafting/Design Engineering Technologies/Technicians, Other (NEW)		11	0
470101	Electrical/Electronics Equipment Installation & Repair, General		10	2
010000	Agriculture, General	Yes	9	2
240199	Liberal Arts & Sciences, General Studies & Humanities, Other		9	0
150403	Electromechanical Technology/Electromechanical Engineering Technology	Yes	8	0
260209	Radiation Biology/Radiobiology	Yes	7	0
410301	Chemical Technology/Technician	Yes	6	0
470303	Industrial Mechanics and Maintenance Technology		5	0
479999	Mechanic and Repair Technologies/Technicians, Other		4	0
480503	Machine Shop Technology/Assistant		4	0
500702	Fine/Studio Arts, General		3	0
511102	Pre-Medicine/Pre-Medical Studies		3	0
480508	Welding Technology/Welder		3	0
520402	Executive Assistant/Executive Secretary		2	0

CIP	Program	STEM	Average Graduates Per Academic Year	
			2000–08	2008–18
Associate degrees (continued)				
521905	Tourism and Travel Services Marketing Operations (NEW)		2	0
150507	Environmental Engineering Technology/Environmental Technology	Yes	2	0
500901	Music, General		2	0
150503	Energy Management and Systems Technology/Technician	Yes	2	0
511699	Nursing, Other		2	0
090701	Radio and Television		1	0
389999	Philosophy and Religious Studies, Other		1	0
420101	Psychology, General		1	1
512306	Occupational Therapy/Therapist		1	2
030511	Forest Technology/Technician (NEW)	Yes	1	0
090101	Communication Studies/Speech Communication and Rhetoric		1	0
150701	Occupational Safety and Health Technology/Technician	Yes	1	0
390604	Pre-Theology/Pre-Ministerial Studies		1	0
520901	Hospitality Administration/Management, General		1	0
521299	Management Information Systems and Services, Other		1	0
150405	Robotics Technology/Technician	Yes	1	0
220001	Pre-Law Studies		1	0
150401	Biomedical Technology/Technician	Yes	1	0
100202	Radio and Television Broadcasting Technology/Technician		0	0
230101	English Language and Literature, General		0	0
240103	Humanities/Humanistic Studies		0	0
390699	Theological and Ministerial Studies, Other		0	0
450101	Social Sciences, General		0	0
510912	Physician Assistant		0	0
149999	Engineering, Other		0	0
159999	Engineering Technologies/Technicians, Other		0	0
540101	History, General		0	0
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)		0	0
090499	Journalism, Other		0	0
190709	Child Care Provider/Assistant		0	0
190901	Apparel and Textiles, General		0	0
310505	Kinesiology and Exercise Science		0	1
451101	Sociology		0	0
480507	Tool and Die Technology/Technician		0	0
510913	Athletic Training/Trainer		0	1
520399	Accounting and Related Services, Other		0	0

APPENDIX 5: SHARE OF 2008 AWARD RECIPIENTS WORKING IN TENNESSEE THREE QUARTERS AFTER GRADUATION

CIP	Program	Total number grad-uates (N)	Awards of less than 1 acad yr	Awards at least 1 but less than 2 acad yrs	Associate degrees	Bachelor's degrees	Masters degrees	Doctoral degrees	First-pro-fessional degrees	All awards
010000	Agriculture, General	1,006	-	-	34.9	58.4	41.7	0.0	-	57.0
010101	Agricultural Business and Management, General	6	-	-	-	-	66.7	-	-	66.7
010102	Agribusiness/Agricultural Business Operations	166	-	-	-	68.1	-	-	-	68.1
010103	Agricultural Economics	61	-	-	-	-	43.6	33.3	-	42.6
010199	Agricultural Business and Management, Other	114	-	-	-	57.0	-	-	-	57.0
010201	Agricultural Mechanization, General	1	-	-	-	0.0	-	-	-	0.0
010601	Applied Horticulture/Horticultural Operations, General	1	-	-	0.0	-	-	-	-	0.0
010603	Ornamental Horticulture	423	-	-	63.9	51.4	52.0	-	-	53.9
010605	Landscaping and Groundskeeping	6	66.7	-	-	-	-	-	-	66.7
010608	Floriculture/Floristry Operations and Management	14	71.4	-	-	-	-	-	-	71.4
010699	Applied Horticulture/Horicultural Business Services, Other	8	-	-	25.0	-	-	-	-	25.0
010901	Animal Sciences, General	535	-	-	-	57.8	35.3	20.0	-	55.0
011001	Food Science	120	-	-	-	35.1	27.5	58.3	-	34.2
011101	Plant Sciences, General	424	-	-	-	61.4	31.8	35.3	-	57.3
011105	Plant Protection and Integrated Pest Management	50	-	-	-	-	30.0	-	-	30.0
030101	Natural Resources/Conservation, General	5	-	-	-	-	-	0.0	-	0.0
030103	Environmental Studies	231	-	-	-	60.1	57.8	50.0	-	59.3
030201	Natural Resources Management and Policy	198	-	-	-	62.6	-	-	-	62.6
030501	Forestry, General	170	-	-	-	40.3	34.8	-	-	38.8
030601	Wildlife and Wildlands Science and Management	411	-	-	-	59.0	31.6	-	-	55.2
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)	420	-	-	-	48.7	45.1	-	-	48.1
040301	City/Urban, Community and Regional Planning	184	-	-	-	-	42.4	-	-	42.4
040401	Environmental Design/Architecture	3	-	-	-	33.3	-	-	-	33.3
050201	African-American/Black Studies	36	-	-	-	63.9	-	-	-	63.9
050207	Women's Studies	1	-	-	-	100.0	-	-	-	100.0
059999	Area, Ethnic, Cultural, and Gender Studies, Other	373	-	-	-	53.4	-	-	-	53.4
090101	Communication Studies/Speech Communication and Rhetoric	893	-	-	-	71.3	50.6	27.1	-	63.3
090102	Mass Communication/Media Studies	3,014	-	-	-	67.8	64.1	25.0	-	67.5
090401	Journalism	1,595	-	-	-	63.7	53.6	-	-	62.9
090499	Journalism, Other	2	-	-	-	50.0	-	-	-	50.0

CIP	Program	Total number grad-uates (N)	Awards of less than 1 acad yr	Awards at least 1 but less than 2 acad yrs	Associate degrees	Bachelor's degrees	Masters degrees	Doctoral degrees	First-pro-fessional degrees	All awards
090701	Radio and Television	610	-	-	-	59.0	-	-	-	59.0
090903	Advertising	586	-	-	-	54.1	-	-	-	54.1
099999	Communication, Journalism, and Related Programs, Other	1	-	-	-	100.0	-	-	-	100.0
100304	Animation, Interactive Technology, Video Graphics & Special Effects	23	-	-	-	60.9	-	-	-	60.9
110101	Computer and Information Sciences, General	1,024	-	-	75.3	59.8	60.0	-	-	65.8
110202	Computer Programming, Specific Applications	43	72.1	-	-	-	-	-	-	72.1
110203	Computer Programming, Vendor/Product Certification	2	100.0	-	-	-	-	-	-	100.0
110401	Information Science/Studies	59	75.0	-	68.1	-	-	-	-	69.5
110501	Computer Systems Analysis/Analyst	9	75.0	100.0	-	-	-	-	-	77.8
110701	Computer Science	1,622	-	-	83.7	53.9	50.6	44.4	-	54.1
110801	Web Page, Digital/Multimedia & Information Resources Design	8	50.0	-	-	-	-	-	-	50.0
110899	Computer Software and Media Applications, Other	27	77.8	-	-	-	-	-	-	77.8
110901	Computer Systems Networking and Telecommunications	212	0.0	-	79.1	-	-	-	-	78.8
111002	System, Networking, and LAN/WAN Management/Manager	1	-	0.0	-	-	-	-	-	0.0
111099	Computer/Information Technology Services Administration & Management, Other	10	-	-	80.0	-	-	-	-	80.0
119999	Computer and Information Sciences & Support Services, Other	14	42.9	-	-	-	-	-	-	42.9
120503	Culinary Arts/Chef Training	57	66.7	-	83.3	-	-	-	-	73.7
130101	Education, General	2,524	-	-	-	-	74.0	46.7	-	70.4
130301	Curriculum and Instruction	3,133	-	-	-	-	82.2	71.4	-	81.5
130401	Educational Leadership and Administration, General	3,290	-	-	-	-	85.5	75.9	-	84.3
130406	Higher Education/Higher Education Administration	48	-	-	-	-	-	60.4	-	60.4
130501	Educational/Instructional Media Design	85	-	-	-	-	77.6	-	-	77.6
131001	Special Education and Teaching, General	1,480	-	-	-	72.6	79.6	-	-	75.5
131101	Counselor Education/School Counseling and Guidance Services	1,174	-	-	-	-	72.0	66.7	-	72.0

CIP	Program	Total number grad-uates (N)	Awards of less than 1 acad yr	Awards at least 1 but less than 2 acad yrs	Associate degrees	Bachelor's degrees	Masters degrees	Doctoral degrees	First-pro-fessional degrees	All awards
131102	College Student Counseling and Personnel Services	93	-	-	-	-	41.9	-	-	41.9
131202	Elementary Education and Teaching	772	-	-	-	-	67.0	-	-	67.0
131203	Junior High/Intermediate/Middle School Education & Teaching	61	-	-	-	73.8	-	-	-	73.8
131205	Secondary Education and Teaching	638	-	-	-	75.6	69.7	-	-	72.1
131206	Teacher Education, Multiple Levels	669	-	-	-	82.6	74.4	-	-	79.2
131209	Kindergarten/Preschool Education and Teaching	154	-	-	-	82.4	74.3	-	-	80.5
131210	Early Childhood Education and Teaching	372	-	-	-	80.2	82.3	-	-	80.6
131301	Agricultural Teacher Education	131	-	-	-	60.3	44.1	-	-	51.9
131302	Art Teacher Education	113	-	-	-	74.3	-	-	-	74.3
131303	Business Teacher Education	269	-	-	-	77.3	83.5	-	-	79.6
131304	Driver and Safety Teacher Education	15	-	-	-	-	73.3	-	-	73.3
131305	English/Language Arts Teacher Education	125	-	-	-	71.2	-	-	-	71.2
131306	Foreign Language Teacher Education	43	-	-	-	100.0	76.2	-	-	76.7
131307	Health Teacher Education	280	-	-	-	61.8	62.5	57.1	-	61.8
131308	Family & Consumer Sciences/Home Economics Teacher Education	10	-	-	-	100.0	55.6	-	-	60.0
131309	Technology Teacher Education/Industrial Arts Teacher Education	127	-	-	-	79.5	-	-	-	79.5
131310	Sales & Marketing Operations/Marketing & Distribution Teacher Education	4	-	-	-	100.0	-	-	-	100.0
131311	Mathematics Teacher Education	67	-	-	-	75.7	86.7	-	-	80.6
131312	Music Teacher Education	92	-	-	-	58.6	77.3	-	-	63.0
131314	Physical Education Teaching and Coaching	31	-	-	-	77.4	-	-	-	77.4
131315	Reading Teacher Education	231	-	-	-	-	59.3	-	-	59.3
131316	Science Teacher Education/General Science Teacher Education	32	-	-	-	75.0	-	-	-	75.0
131318	Social Studies Teacher Education	118	-	-	-	69.5	-	-	-	69.5
131319	Technical Teacher Education	448	-	-	-	71.2	78.3	-	-	75.0
131322	Biology Teacher Education	43	-	-	-	87.0	90.0	-	-	88.4
131323	Chemistry Teacher Education	1	-	-	-	0.0	-	-	-	0.0
131328	History Teacher Education	46	-	-	-	84.8	-	-	-	84.8

CIP	Program	Total number grad-uates (N)	Awards of less than 1 acad yr	Awards at least 1 but less than 2 acad yrs	Associate degrees	Bachelor's degrees	Masters degrees	Doctoral degrees	First-pro-fessional degrees	All awards
131330	Spanish Language Teacher Education	4	-	-	-	75.0	-	-	-	75.0
131332	Geography Teacher Education	5	-	-	-	100.0	-	-	-	100.0
131399	Teacher Education & Professional Development, Specific Subject Areas, Other	47	-	-	-	50.0	71.8	-	-	68.1
140101	Engineering, General	644	-	-	-	55.6	39.4	37.8	-	50.6
140201	Aerospace, Aeronautical and Astronautical Engineering	98	-	-	-	19.4	11.1	33.3	-	18.4
140301	Agricultural/Biological Engineering and Bioengineering	81	-	-	-	37.5	48.8	12.5	-	40.7
140401	Architectural Engineering	78	-	-	-	32.1	-	-	-	32.1
140501	Biomedical/Medical Engineering	143	-	-	-	-	24.0	22.7	-	23.8
140701	Chemical Engineering	479	-	-	-	35.5	20.2	36.0	-	32.4
140801	Civil Engineering, General	1,205	-	-	-	62.5	51.7	37.0	-	59.3
140901	Computer Engineering, General	155	-	-	-	45.3	31.3	-	-	43.9
141001	Electrical, Electronics and Communications Engineering	1,427	-	-	-	39.0	21.3	40.7	-	34.5
141201	Engineering Physics	10	-	-	-	20.0	-	-	-	20.0
141301	Engineering Science	198	-	-	-	35.8	32.7	43.5	-	35.9
141401	Environmental/Environmental Health Engineering	110	-	-	-	-	50.0	-	-	50.0
141801	Materials Engineering	74	-	-	-	30.3	26.1	33.3	-	29.7
141901	Mechanical Engineering	1,533	-	-	-	54.0	33.1	42.9	-	50.0
142001	Metallurgical Engineering	35	-	-	-	-	20.0	33.3	-	25.7
142301	Nuclear Engineering	139	-	-	-	15.2	35.6	35.3	-	28.8
142701	Systems Engineering	1	-	-	-	-	-	0.0	-	0.0
143201	Polymer/Plastics Engineering	36	-	-	-	-	12.5	16.7	-	13.9
143501	Industrial Engineering	627	-	-	-	56.1	44.2	-	-	50.7
150000	Engineering Technology, General	1,053	-	-	87.5	66.0	40.6	-	-	58.3
150101	Architectural Engineering Technology/Technician	185	50.0	-	75.2	70.0	-	-	-	73.5
150201	Civil Engineering Technology/Technician	154	-	-	76.8	100.0	-	-	-	77.3
150303	Electrical, Electronic & Communications Engineering Technology/Technician	773	100.0	-	75.4	72.5	-	-	-	75.7
150401	Biomedical Technology/Technician	22	-	-	68.2	-	-	-	-	68.2
150403	Electromechanical Technology/Electromechanical Engineering Technology	150	89.6	-	72.3	-	-	-	-	80.0
150405	Robotics Technology/Technician	16	-	-	81.3	-	-	-	-	81.3
150506	Water Quality & Wastewater Treatment Management & Recycling Technology/Technician	2	50.0	-	-	-	-	-	-	50.0

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150507	Environmental Engineering Technology/Environmental Technology	111	80.0	-	83.3	74.0	-	-	-	76.6
150599	Environmental Control Technologies/Technicians, Other	1	-	-	0.0	-	-	-	-	0.0
150612	Industrial Technology/Technician	959	85.7	-	78.3	65.2	77.3	-	-	72.6
150613	Manufacturing Technology/Technician	146	66.7	86.7	84.2	74.6	-	-	-	79.5
150701	Occupational Safety and Health Technology/Technician	14	-	-	64.3	-	-	-	-	64.3
150702	Quality Control Technology/Technician	7	100.0	-	-	-	-	-	-	100.0
150801	Aeronautical/Aerospace Engineering Technology/Technician	81	-	-	-	43.2	-	-	-	43.2
150805	Mechanical Engineering/Mechanical Technology/Technician	233	-	-	85.4	42.9	-	-	-	84.1
151102	Surveying Technology/Surveying	79	-	-	-	45.6	-	-	-	45.6
151201	Computer Engineering Technology/Technician	361	100.0	-	72.8	67.2	-	-	-	70.9
151202	Computer Technology/Computer Systems Technology	168	-	-	81.0	-	-	-	-	81.0
151301	Drafting and Design Technology/Technician, General	272	77.8	-	78.7	-	-	-	-	78.7
151303	Architectural Drafting and Architectural CAD/CADD	2	-	-	100.0	-	-	-	-	100.0
151306	Mechanical Drafting and Mechanical Drafting CAD/CADD	1	-	0.0	-	-	-	-	-	0.0
151501	Engineering/Industrial Management	102	-	-	-	52.7	44.7	-	-	49.0
159999	Engineering Technologies/Technicians, Other	130	-	-	-	50.4	28.6	-	-	49.2
160101	Foreign Languages and Literatures, General	558	-	-	-	54.1	-	40.0	-	53.6
160402	Russian Language and Literature	19	-	-	-	36.8	-	-	-	36.8
160501	German Language and Literature	75	-	-	-	44.4	28.6	-	-	40.0
160900	Romance Languages, Literatures, & Linguistics, General	38	-	-	-	-	52.6	-	-	52.6
160901	French Language and Literature	122	-	-	-	45.7	46.4	-	-	45.9
160902	Italian Language and Literature	12	-	-	-	41.7	-	-	-	41.7
160905	Spanish Language and Literature	326	-	-	-	44.0	64.3	-	-	46.6
160999	Romance Languages, Literatures, and Linguistics, Other	13	-	-	-	-	61.5	-	-	61.5
161200	Classics & Classical Languages, Literatures, & Linguistics, General	42	-	-	-	47.6	-	-	-	47.6
161203	Latin Language and Literature	2	-	-	-	50.0	-	-	-	50.0

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161603	Sign Language Interpretation and Translation	47	100.0	-	72.7	-	-	-	-	74.5
190101	Family and Consumer Sciences/Human Sciences, General	1,528	-	-	-	69.1	67.0	48.6	-	67.1
190401	Family Resource Management Studies, General	354	-	-	-	71.8	-	-	-	71.8
190402	Consumer Economics	713	-	-	-	67.6	47.7	-	-	65.8
190501	Foods, Nutrition, and Wellness Studies, General	269	-	-	-	53.6	47.9	-	-	52.0
190505	Foodservice Systems Administration/Management	9	100.0	-	-	-	-	-	-	100.0
190701	Human Development and Family Studies, General	469	-	-	-	50.9	67.0	-	-	57.4
190704	Family Systems	271	-	-	-	59.4	-	-	-	59.4
190706	Child Development	1,153	60.6	50.0	83.7	69.3	-	-	-	71.7
190708	Child Care and Support Services Management	21	42.9	-	-	-	-	-	-	42.9
190799	Human Development, Family Studies, & Related Services, Other	50	94.0	-	-	-	-	-	-	94.0
190901	Apparel and Textiles, General	187	-	-	-	74.9	-	-	-	74.9
210101	Technology Education/Industrial Arts	1,383	-	-	73.5	-	-	-	-	73.5
220101	Law (LL.B., J.D.)	2,067	-	-	-	-	-	-	62.3	62.3
220302	Legal Assistant/Paralegal	723	-	93.8	74.8	71.0	-	-	-	74.7
220303	Court Reporting/Court Reporter	8	-	-	62.5	-	-	-	-	62.5
230101	English Language and Literature, General	3,694	-	-	-	61.2	61.0	62.4	-	61.2
230501	Creative Writing	48	-	-	-	-	37.5	-	-	37.5
231001	Speech and Rhetorical Studies	399	-	-	-	56.6	-	-	-	56.6
231101	Technical and Business Writing	16	100.0	-	-	46.7	-	-	-	50.0
240101	Liberal Arts and Sciences/Liberal Studies	13,796	66.7	66.7	67.0	68.7	74.8	-	-	67.3
240102	General Studies	1,094	-	-	24.5	66.5	-	-	-	50.8
240103	Humanities/Humanistic Studies	59	-	-	-	44.1	-	-	-	44.1
250101	Library Science/Librarianship	409	-	-	-	-	52.3	-	-	52.3
260101	Biology/Biological Sciences, General	3,689	-	-	-	55.1	46.3	55.0	-	54.1
260102	Biomedical Sciences, General	6	-	-	-	-	100.0	40.0	-	50.0
260202	Biochemistry	93	-	-	-	32.1	15.8	23.9	-	24.7
260301	Botany/Plant Biology	43	-	-	-	46.2	26.7	26.7	-	32.6
260403	Anatomy	26	-	-	-	-	0.0	12.5	-	11.5
260503	Medical Microbiology and Bacteriology	149	-	-	-	62.3	53.6	23.3	-	45.0
260701	Zoology/Animal Biology	66	-	-	-	50.0	61.5	26.3	-	45.5
260707	Animal Physiology	13	-	-	-	-	0.0	16.7	-	15.4

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260910	Pathology/Experimental Pathology	23	-	-	-	-	-	43.5	-	43.5
261001	Pharmacology	11	-	-	-	-	-	18.2	-	18.2
261301	Ecology	67	-	-	-	66.7	36.4	12.9	-	26.9
261309	Epidemiology	23	-	-	-	-	78.3	-	-	78.3
269999	Biological and Biomedical Sciences, Other	85	-	-	-	-	30.0	24.4	-	27.1
270101	Mathematics, General	1,045	-	-	-	56.3	45.2	20.5	-	49.4
270301	Applied Mathematics	28	-	-	-	39.3	-	-	-	39.3
270501	Statistics, General	138	-	-	-	40.6	21.6	-	-	30.4
300101	Biological and Physical Sciences	73	-	-	-	65.8	-	-	-	65.8
300601	Systems Science and Theory	83	-	-	-	-	3.6	-	-	3.6
309999	Multi-/Interdisciplinary Studies, Other	7,228	-	-	-	73.6	2.5	-	-	73.2
310101	Parks, Recreation and Leisure Studies	6	-	-	-	-	33.3	-	-	33.3
310301	Parks, Recreation and Leisure Facilities Management	579	-	-	-	59.8	48.8	-	-	58.2
310501	Health and Physical Education, General	2,622	-	-	-	66.1	46.2	46.8	-	57.7
310504	Sport and Fitness Administration/Management	501	-	-	-	50.8	80.0	-	-	51.1
310505	Kinesiology and Exercise Science	1,030	-	-	-	63.4	51.9	-	-	61.3
320101	Basic Skills, General	165	76.1	93.5	-	-	-	-	-	79.4
380101	Philosophy	427	-	-	-	51.4	23.1	40.4	-	45.9
380201	Religion/Religious Studies	80	-	-	-	40.0	-	-	-	40.0
389999	Philosophy and Religious Studies, Other	44	-	-	-	43.2	-	-	-	43.2
400501	Chemistry, General	1,208	-	-	-	48.9	30.0	27.3	-	44.0
400601	Geology/Earth Science, General	427	-	-	-	57.6	29.3	33.3	-	51.8
400603	Geophysics and Seismology	2	-	-	-	-	-	0.0	-	0.0
400801	Physics, General	239	-	-	-	39.5	25.0	27.6	-	33.5
410301	Chemical Technology/Technician	96	-	-	87.5	-	-	-	-	87.5
420101	Psychology, General	6,717	-	-	-	62.3	49.7	31.6	-	59.5
420601	Counseling Psychology	65	-	-	-	-	-	15.4	-	15.4
420901	Industrial and Organizational Psychology	137	-	-	-	77.0	-	16.7	-	66.4
421701	School Psychology	14	-	-	-	-	14.3	-	-	14.3
421801	Educational Psychology	326	-	-	-	-	60.1	55.8	-	59.5
430103	Criminal Justice/Law Enforcement Administration	2,695	-	-	-	70.1	69.5	-	-	70.0
430107	Criminal Justice/Police Science	1,428	92.0	-	83.2	-	-	-	-	89.1
430109	Security and Loss Prevention Services	9	66.7	-	-	-	-	-	-	66.7
430203	Fire Science/Firefighting	207	92.5	-	91.4	-	-	-	-	91.8
440201	Community Organization and Advocacy	432	-	-	68.2	60.2	-	-	-	63.4

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440401	Public Administration	376	-	-	-	60.6	65.6	58.3	-	64.9
440701	Social Work	2,807	-	-	-	71.1	67.4	21.9	-	68.9
450101	Social Sciences, General	19	-	-	-	68.4	-	-	-	68.4
450201	Anthropology	777	-	-	-	60.0	42.4	34.1	-	55.0
450601	Economics, General	826	-	-	-	58.4	42.4	61.5	-	57.1
450701	Geography	444	-	-	-	57.9	44.3	10.5	-	53.2
450702	Cartography	64	71.2	-	50.0	-	-	-	-	67.2
450799	Geography, Other	56	-	-	-	73.2	-	-	-	73.2
450901	International Relations and Affairs	176	-	-	-	47.7	-	-	-	47.7
451001	Political Science and Government, General	2,255	-	-	-	55.7	40.9	25.0	-	54.7
451101	Sociology	2,178	-	-	-	62.6	49.0	26.7	-	61.2
459999	Social Sciences, Other	191	-	-	-	56.5	-	-	-	56.5
460302	Electrician	141	63.6	94.1	-	-	-	-	-	89.4
470101	Electrical/Electronics Equipment Installation & Repair, General	107	-	66.7	67.3	-	-	-	-	67.3
470201	Heating, Air Conditioning, Ventilation & Refrigeration Maintenance Technology/Technician	8	-	50.0	-	-	-	-	-	50.0
470303	Industrial Mechanics and Maintenance Technology	96	100.0	55.6	77.4	-	-	-	-	77.1
470604	Automobile/Automotive Mechanics Technology/Technician	212	-	65.0	77.3	-	-	-	-	75.0
479999	Mechanic and Repair Technologies/Technicians, Other	42	76.2	-	-	-	-	-	-	76.2
480503	Machine Shop Technology/Assistant	66	-	33.3	85.7	-	-	-	-	83.3
480507	Tool and Die Technology/Technician	1	-	-	100.0	-	-	-	-	100.0
480508	Welding Technology/Welder	71	68.8	66.7	78.6	-	-	-	-	71.8
490101	Aeronautics/Aviation/Aerospace Science & Technology, General	520	-	-	-	50.2	-	-	-	50.2
490104	Aviation/Airway Management and Operations	14	-	-	-	-	28.6	-	-	28.6
500101	Visual and Performing Arts, General	94	-	-	-	54.3	-	-	-	54.3
500401	Design and Visual Communications, General	11	-	-	-	54.5	-	-	-	54.5
500402	Commercial and Advertising Art	887	-	-	73.0	59.6	-	-	-	70.6
500408	Interior Design	284	-	-	61.3	58.1	42.9	-	-	58.1
500501	Drama and Dramatics/Theatre Arts, General	1,250	-	-	-	61.6	23.2	-	-	59.0
500602	Cinematography and Film/Video Production	80	-	-	76.3	-	-	-	-	76.3

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500605	Photography	146	55.1	-	70.8	-	-	-	-	60.3
500701	Art/Art Studies, General	1,213	-	-	-	67.2	36.4	-	-	64.7
500702	Fine/Studio Arts, General	463	-	-	-	47.6	43.1	-	-	46.9
500703	Art History, Criticism and Conservation	168	-	-	-	52.0	29.3	-	-	46.4
500901	Music, General	1,322	-	-	-	54.0	45.5	37.1	-	51.0
500903	Music Performance, General	9	-	-	-	44.4	-	-	-	44.4
500909	Music Management and Merchandising	1,663	66.7	-	-	58.9	-	-	-	58.9
500999	Music, Other	154	-	62.8	-	54.4	-	-	-	59.1
509999	Visual and Performing Arts, Other	6	-	33.3	-	-	-	-	-	33.3
510202	Audiology/Audiologist and Hearing Sciences	114	-	-	-	45.7	28.8	83.3	-	36.8
510203	Speech-Language Pathology/Pathologist	446	-	-	-	53.8	61.1	-	-	58.7
510204	Audiology/Audiologist & Speech-Language Pathology/Pathologist	653	-	-	-	50.0	51.2	15.6	-	49.3
510401	Dentistry (DDS, DMD)	531	-	-	-	-	-	-	31.5	31.5
510501	Dental Clinical Sciences, General (MS, PhD)	25	-	-	-	-	0.0	-	-	0.0
510601	Dental Assisting/Assistant	186	-	86.0	-	-	-	-	-	86.0
510602	Dental Hygiene/Hygienist	744	-	-	78.7	75.6	-	-	-	77.4
510701	Health/Health Care Administration/Management	169	-	-	-	61.5	-	50.0	-	60.9
510702	Hospital & Health Care Facilities Administration/Management	79	-	-	-	-	59.5	-	-	59.5
510706	Health Information/Medical Records Administration/Administrator	175	-	-	-	76.6	-	-	-	76.6
510707	Health Information/Medical Records Technology/Technician	393	78.6	-	87.5	-	-	-	-	85.2
510708	Medical Transcription/Transcriptionist	167	76.6	-	-	-	-	-	-	76.6
510713	Medical Insurance Coding Specialist/Coder	8	75.0	-	-	-	-	-	-	75.0
510799	Health and Medical Administrative Services, Other	9	71.4	-	-	-	100.0	-	-	77.8
510801	Medical/Clinical Assistant	32	-	-	84.4	-	-	-	-	84.4
510803	Occupational Therapist Assistant	170	-	-	81.8	-	-	-	-	81.8
510805	Pharmacy Technician/Assistant	284	88.2	82.4	-	-	-	-	-	85.2
510806	Physical Therapist Assistant	634	-	-	76.5	-	-	-	-	76.5
510808	Veterinary/Animal Health Technology/Technician & Veterinary Assistant	132	-	-	77.3	-	-	-	-	77.3
510901	Cardiovascular Technology/Technologist	57	-	-	75.4	-	-	-	-	75.4

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510904	Emergency Medical Technology/Technician (EMT Paramedic)	2,083	80.5	94.4	93.3	-	-	-	-	86.4
510905	Nuclear Medical Technology/Technologist	69	-	29.0	-	-	-	-	-	29.0
510907	Medical Radiologic Technology/Science - Radiation Therapist	1,129	-	43.2	87.2	-	-	-	-	83.8
510908	Respiratory Care Therapy/Therapist	613	-	92.1	87.9	74.1	-	-	-	86.0
510909	Surgical Technology/Technologist	206	-	90.8	-	-	-	-	-	90.8
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician	73	77.8	49.1	-	-	-	-	-	56.2
510913	Athletic Training/Trainer	124	-	-	-	64.9	23.0	-	-	35.5
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other	50	90.0	-	-	-	-	-	-	90.0
511001	Blood Bank Technology Specialist	174	75.3	-	-	-	-	-	-	75.3
511002	Cytotechnology/Cytotechnologist	47	-	-	-	59.6	-	-	-	59.6
511004	Clinical/Medical Laboratory Technician	209	-	-	87.1	-	-	-	-	87.1
511005	Clinical Laboratory Science/Medical Technology/Technologist	208	-	-	-	77.4	-	-	-	77.4
511099	Clinical/Medical Laboratory Science & Allied Professions, Other	79	88.6	-	-	-	-	-	-	88.6
511199	Health/Medical Preparatory Programs, Other	46	-	-	-	65.2	-	-	-	65.2
511201	Medicine (MD)	1,506	-	-	-	-	-	-	34.5	34.5
511501	Substance Abuse/Addiction Counseling	115	63.5	-	-	-	-	-	-	63.5
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)	10,254	-	-	89.9	79.4	66.7	-	-	83.0
511608	Nursing Science (MS, PhD)	309	-	-	-	-	76.0	67.4	-	73.5
511801	Opticianry/Ophthalmic Dispensing Optician	110	-	-	87.3	-	-	-	-	87.3
511803	Opthalmic Technician/Technologist	30	-	-	76.7	-	-	-	-	76.7
512001	Pharmacy (PharmD [USA] PharmD, BS/BPharm [Canada])	642	-	-	-	-	-	-	77.3	77.3
512004	Medicinal and Pharmaceutical Chemistry (MS, PhD)	24	-	-	-	-	0.0	19.0	-	16.7
512201	Public Health, General (MPH, DPH)	531	-	-	-	73.6	53.7	-	-	63.5
512202	Environmental Health	256	-	-	80.0	60.9	45.7	-	-	59.4

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512205	Health/Medical Physics	1	-	-	100.0	-	-	-	-	100.0
512206	Occupational Health and Industrial Hygiene	6	100.0	-	-	-	-	-	-	100.0
512299	Public Health, Other	43	-	-	-	-	76.7	-	-	76.7
512305	Music Therapy/Therapist	5	-	-	-	80.0	-	-	-	80.0
512306	Occupational Therapy/Therapist	367	-	-	-	70.0	-	-	-	70.0
512308	Physical Therapy/Therapist	808	-	-	-	63.6	72.6	66.7	-	66.8
512310	Vocational Rehabilitation Counseling/Counselor	30	-	-	-	20.0	52.0	-	-	46.7
512401	Veterinary Medicine (DVM)	430	-	-	-	-	-	-	40.7	40.7
513101	Dietetics/Dietitian (RD)	89	-	-	-	-	57.3	-	-	57.3
513102	Clinical Nutrition/Nutritionist	13	-	-	-	-	61.5	-	-	61.5
513104	Dietitian Assistant	43	-	-	79.1	-	-	-	-	79.1
513501	Massage Therapy/Therapeutic Massage	86	47.7	-	-	-	-	-	-	47.7
519999	Health Professions and Related Clinical Sciences, Other	660	-	-	82.5	63.4	50.0	35.9	-	74.4
520101	Business/Commerce, General	1,457	90.9	-	69.2	62.4	-	-	-	64.4
520201	Business Administration and Management, General	14,898	95.2	90.9	76.0	71.8	62.6	11.8	-	68.7
520203	Logistics and Materials Management	1,047	50.0	66.7	-	45.3	-	-	-	45.4
520204	Office Management and Supervision	540	89.9	-	-	64.4	-	-	-	72.4
520205	Operations Management and Supervision	24	-	-	-	79.2	-	-	-	79.2
520206	Non-Profit/Public/Organizational Management	737	-	-	-	33.9	54.3	-	-	35.8
520208	E-Commerce/Electronic Commerce	10	-	-	-	-	70.0	-	-	70.0
520299	Business Administration, Management and Operations, Other	255	-	-	87.1	-	-	-	-	87.1
520301	Accounting	4,003	-	-	-	71.3	62.1	-	-	69.1
520302	Accounting Technology/Technician and Bookkeeping	676	66.7	60.0	81.0	-	-	-	-	79.6
520399	Accounting and Related Services, Other	222	-	-	-	-	65.3	-	-	65.3
520401	Administrative Assistant and Secretarial Science, General	1,649	70.9	75.7	78.9	62.5	-	-	-	77.3
520407	Business/Office Automation/Technology/Data Entry	89	81.4	65.4	45.0	-	-	-	-	68.5
520601	Business/Managerial Economics	483	-	-	-	60.6	17.2	27.3	-	55.7
520701	Entrepreneurship/Entrepreneurial Studies	23	-	-	-	69.6	-	-	-	69.6
520801	Finance, General	2,789	87.5	-	100.0	68.8	-	-	-	69.0

CIP	Program	Total number grad-uates (N)	Awards of less than 1 acad yr	Awards at least 1 but less than 2 acad yrs	Associate degrees	Bachelor's degrees	Masters degrees	Doctoral degrees	First-pro-fessional degrees	All awards
520803	Banking and Financial Support Services	1	-	-	-	100.0	-	-	-	100.0
520904	Hotel/Motel Administration/Management	374	-	-	78.2	52.4	0.0	-	-	57.5
521101	International Business/Trade/Commerce	140	-	-	-	66.1	63.6	-	-	65.7
521201	Management Information Systems, General	3,094	66.7	-	76.1	77.9	-	-	-	76.9
521299	Management Information Systems and Services, Other	79	88.2	-	75.8	-	-	-	-	78.5
521301	Management Science, General	39	-	-	-	-	42.9	36.4	-	41.0
521401	Marketing/Marketing Management, General	3,403	-	-	-	70.0	-	-	-	70.0
521501	Real Estate	62	-	-	-	71.0	-	-	-	71.0
521601	Taxation	7	-	-	-	-	57.1	-	-	57.1
521701	Insurance	29	-	-	-	62.1	-	-	-	62.1
521801	Sales, Distribution, and Marketing Operations, General	67	93.8	-	84.3	-	-	-	-	86.6
521804	Selling Skills and Sales Operations	132	-	-	-	77.3	-	-	-	77.3
521902	Fashion Merchandising	1	-	-	-	100.0	-	-	-	100.0
529999	Business, Management, Marketing, & Related Support Services, Other	167	75.0	-	75.3	0.0	-	-	-	74.9
540101	History, General	2,077	-	-	-	58.0	46.2	52.7	-	56.0

APPENDIX 6: CAREER PATHWAYS—SUPPLY AND DEMAND PROJECTIONS

A Brief Users Guide to Appendix 6

This appendix includes detailed data for each of the career pathways included in the report. The methodology used to develop the estimates is included in the report narrative. All individual instructional programs and all award levels contributing to career pathway supply are presented first. The average number of graduates for the historical 2000-2008 academic year period, the projected number of graduates for academic year 2018 and the average number of awards projected to be granted between the 2008-2018 academic years are included in the supply panel of the tables.

All occupations contributing to career pathway demand are presented next, regardless of the training/education required for the position. Estimates of average annual openings for 2008-2018 are reported for each occupation. The estimates were developed by the Tennessee Department of Labor and Workforce Development.

Two panels of summary data appear at the end of each career pathway. The first panel provides overall estimates of supply and demand *regardless of award level and minimum educational requirement*. Figures are presented showing Demand minus Supply and the Supply to Demand Ratio. These figures indicate whether the career path is projected to have an annual surplus or shortfall of awards relative to occupational demand. For example, career pathway 1.1, the Food Products and Processing Systems Pathway, yields annual supply of 31 versus annual position openings of 552. This produces a difference between demand and supply of 521 and a supply to demand ratio of 0.06 which reflects a shortfall.

The final panel of the career pathway tables restricts supply to only awards at the Associate's level or higher; demand is similarly confined to occupations requiring a minimum of an Associate's degree. These figures provide additional clarity on whether or not there are supply and demand imbalances for the majority of awards produced by institutions of higher education in Tennessee. Referring again to career pathway 1.1, annual supply is still projected to be 31 per year since the minimum award level for this field is an Associate's degree. However, the vast majority of jobs on the demand side of the labor market for this career pathway require no formal academic award. In fact, only 9 positions per year require an Associate's degree or higher—in this instance all of the positions require a Bachelor's degree. These adjustments produce a difference between demand and supply of -22 and a supply to demand ratio of 3.48 indicating a surplus for positions and instructional programs requiring at least an Associate's degree. A supply to demand ratio of 1 means supply is perfectly calibrated to demand.

Sample Career Pathway and Supply-Demand Analysis

Career pathway —— | Career Path: 1.1 Food Products and Processing Systems Pathway

SUPPLY

All instructional programs and all award levels contributing to the career pathway

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
010106	Agricultural Business Technology				
	Associate degrees	Yes	0	3	2
			0	3	2
010199	Agricultural Business and Management, Other				
	Bachelor's degrees	Yes	18	17	16
			18	17	16
011001	Food Science				
	Bachelor's degrees	Yes	9	6	9
	Masters degrees	Yes	5	0	1
	Doctoral degrees	Yes	2	3	4
			17	9	14
	1.1 TOTAL SUPPLY		34	29	31

DEMAND

All occupations with the minimum educational requirements contributing to the career pathway

SOC	Occupation	Average Annual Openings, 2008-18
191012	Food scientists and technologists	9
	Bachelor's degree	
451011	First-line supervisors/managers of farming, fishing, and forestry workers	81
	Work experience in a related occupation	
452011	Agricultural inspectors	9
	Work experience in a related occupation	
452041	Graders and sorters, agricultural products	19
	Work experience in a related occupation	
513021	Butchers and meat cutters	74
	Long-term on-the-job training	
513022	Meat, poultry, and fish cutters and trimmers	217
	Short-term on-the-job training	
513023	Slaughterers and meat packers	18
	Moderate-term on-the-job training	
513091	Food and tobacco roasting, baking, and drying machine operators and tenders	11
	Short-term on-the-job training	
513092	Food batchmakers	68
	Short-term on-the-job training	
513093	Food cooking machine operators and tenders	46
	Short-term on-the-job training	
	1.1 TOTAL DEMAND	552

SUPPLY:	31
DEMAND:	552
Demand minus Supply:	521
Supply to Demand Ratio:	0.06

Overall estimates of supply and demand regardless of award level and minimum educational requirements

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	31
DEMAND:	9
Demand minus Supply:	-22
Supply to Demand Ratio:	3.48

Estimates of supply and demand restricted to associate's level or higher; surplus implies that higher education is over-supplying graduates who will then compete against those with no formal credential

Career Path: 1.1 Food Products and Processing Systems Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
010106	Agricultural Business Technology				
	Associate degrees	Yes	0	3	2
			0	**3**	**2**
010199	Agricultural Business and Management, Other				
	Bachelor's degrees	Yes	18	17	16
			18	**17**	**16**
011001	Food Science				
	Bachelor's degrees	Yes	9	6	9
	Masters degrees	Yes	5	0	1
	Doctoral degrees	Yes	2	3	4
			17	**9**	**14**
	1.1 TOTAL SUPPLY		**34**	**29**	**31**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
191012	Food scientists and technologists	9
	Bachelor's degree	
451011	First-line supervisors/managers of farming, fishing, and forestry workers	81
	Work experience in a related occupation	
452011	Agricultural inspectors	9
	Work experience in a related occupation	
452041	Graders and sorters, agricultural products	19
	Work experience in a related occupation	
513021	Butchers and meat cutters	74
	Long-term on-the-job training	
513022	Meat, poultry, and fish cutters and trimmers	217
	Short-term on-the-job training	
513023	Slaughterers and meat packers	18
	Moderate-term on-the-job training	
513091	Food and tobacco roasting, baking, and drying machine operators and tenders	11
	Short-term on-the-job training	
513092	Food batchmakers	68
	Short-term on-the-job training	
513093	Food cooking machine operators and tenders	46
	Short-term on-the-job training	
	1.1 TOTAL DEMAND	**552**

SUPPLY:	**31**
DEMAND:	**552**
Demand minus Supply:	**521**
Supply to Demand Ratio:	**0.06**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**31**
DEMAND:	**9**
Demand minus Supply:	**-22**
Supply to Demand Ratio:	**3.48**

Career Path: 1.2 Plant Systems Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
010000	Agriculture, General				
	Associate degrees	Yes	9	0	2
	Bachelor's degrees	Yes	138	197	155
	Masters degrees	Yes	4	19	11
	Doctoral degrees	Yes	1	9	6
			152	**225**	**174**
010101	Agricultural Business and Management, General				
	Bachelor's degrees	Yes	2	0	0
	Masters degrees	Yes	2	15	10
			5	**15**	**10**
010102	Agribusiness/Agricultural Business Operations				
	Bachelor's degrees	Yes	25	19	25
			25	**19**	**25**
010103	Agricultural Economics				
	Masters degrees	Yes	8	15	11
			8	**15**	**11**
010601	Applied Horticulture/Horticultural Operations, General				
	Awards of less than 1 academic year	Yes	0	1	1
	Associate degrees	Yes	1	13	7
			1	**14**	**8**
010603	Ornamental Horticulture				
	Associate degrees	Yes	11	3	6
	Bachelor's degrees	Yes	27	0	0
	Masters degrees	Yes	2	0	0
			40	**3**	**6**
010605	Landscaping and Groundskeeping				
	Awards of less than 1 academic year	Yes	5	25	20
			5	**25**	**20**
010607	Turf and Turfgrass Management				
	Awards of less than 1 academic year	Yes	1	0	1
			1	**0**	**1**
010699	Applied Horticulture/Horicultural Business Services, Other				
	Associate degrees	Yes	3	14	9
			3	**14**	**9**
011101	Plant Sciences, General				
	Bachelor's degrees	Yes	53	69	72
	Masters degrees	Yes	8	13	13
	Doctoral degrees	Yes	2	0	0
			62	**82**	**85**
011105	Plant Protection and Integrated Pest Management				
	Masters degrees	Yes	6	0	2
			6	**0**	**2**

Career Path: 1.2 Plant Systems Pathway

011202	Soil Chemistry and Physics				
	Masters degrees	Yes	0	2	2
			0	**2**	**2**
019999	Agriculture, Agriculture Operations, & Related Sciences, Other				
	Bachelor's degrees	Yes	6	0	7
	Masters degrees	Yes	1	0	1
			7	**0**	**8**
	1.2 TOTAL SUPPLY		**315**	**414**	**359**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119011	Farm, ranch, and other agricultural managers Bachelor's or higher degree, plus work experience	318
191013	Soil and plant Scientists Bachelor's degree	2
191021	Biochemists and biophysicists Doctoral degree	4
191032	Foresters Bachelor's degree	6
259021	Farm and home management advisors Bachelor's degree	4
371012	First-line supervisors/managers of landscaping, lawn service, and groundskeeping wo Work experience in a related occupation	64
373012	Pesticide handlers, sprayers, and applicators, vegetation Moderate-term on-the-job training	5
373013	Tree trimmers and pruners Short-term on-the-job training	32
452092	Farmworkers and laborers, crop, nursery, and greenhouse Short-term on-the-job training	791
493041	Farm equipment mechanics Long-term on-the-job training	19
	1.2 TOTAL DEMAND	**1,245**

SUPPLY:	**359**
DEMAND:	**1,245**
Demand minus Supply:	**886**
Supply to Demand Ratio:	**0.29**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**338**
DEMAND:	**334**
Demand minus Supply:	**-4**
Supply to Demand Ratio:	**1.01**

Career Path: **1.3 Animal Systems Pathway**

SUPPLY

			Average Graduates		
CIP	**Program**	**STEM**	**2000-08**	**2018**	**2008-18**
010901	Animal Sciences, General				
	Associate degrees	Yes	1	2	1
	Bachelor's degrees	Yes	84	123	110
	Masters degrees	Yes	5	1	2
	Doctoral degrees	Yes	2	1	2
			92	**127**	**114**
	1.3 TOTAL SUPPLY		**92**	**127**	**114**

DEMAND

SOC	**Occupation**	**Average Annual Openings, 2008-18**
191011	Animal scientists Doctoral degree	0
191023	Zoologists and wildlife biologists Bachelor's degree	4
291131	Veterinarians First professional degree	47
292056	Veterinary technologists and technicians Associate degree	95
319096	Veterinary assistants and laboratory animal caretakers Short-term on-the-job training	46
392021	Nonfarm animal caretakers Short-term on-the-job training	89
411011	First-line supervisors/managers of retail sales workers Work experience in a related occupation	913
452021	Animal breeders Work experience in a related occupation	5
452093	Farmworkers, farm and ranch animals Short-term on-the-job training	93
	1.3 TOTAL DEMAND	**1,292**

SUPPLY:	**114**
DEMAND:	**1,292**
Demand minus Supply:	**1,178**
Supply to Demand Ratio:	**0.09**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**114**
DEMAND:	**146**
Demand minus Supply:	**32**
Supply to Demand Ratio:	**0.78**

Career Path: **1.4 Power Structural and Technical Systems Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
412022	Parts salespersons Moderate-term on-the-job training	219
452091	Agricultural equipment operators Short-term on-the-job training	82
	1.4 TOTAL DEMAND	**301**

SUPPLY:	**0**
DEMAND:	**301**
Demand minus Supply:	**301**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

- -

Career Path: **1.5 Natural Resources Systems Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
030101	Natural Resources/Conservation, General				
	Bachelor's degrees	Yes	9	17	19
	Doctoral degrees	Yes	2	12	10
			11	**29**	**29**
030103	Environmental Studies				
	Bachelor's degrees	Yes	27	0	0
	Masters degrees	Yes	8	4	7
	Doctoral degrees	Yes	1	0	2
			37	**4**	**9**
030104	Environmental Science				
	Bachelor's degrees	Yes	4	20	14
			4	**20**	**14**
030201	Natural Resources Management and Policy				
	Bachelor's degrees	Yes	26	11	18
			26	**11**	**18**
030501	Forestry, General				
	Associate degrees	Yes	1	1	2
	Bachelor's degrees	Yes	16	3	9
	Masters degrees	Yes	5	4	3
			23	**8**	**14**
030502	Forest Sciences and Biology				
	Bachelor's degrees	Yes	3	5	2
			3	**5**	**2**
030511	Forest Technology/Technician				
	Associate degrees	Yes	1	0	0
			1	**0**	**0**
030599	Forestry, Other				
	Bachelor's degrees	Yes	4	0	0
			4	**0**	**0**
030601	Wildlife and Wildlands Science and Management				
	Bachelor's degrees	Yes	51	27	32
	Masters degrees	Yes	7	4	5
			59	**31**	**37**
310101	Parks, Recreation and Leisure Studies				
	Bachelor's degrees		9	6	11
	Masters degrees		2	7	5
			11	**13**	**16**
310301	Parks, Recreation and Leisure Facilities Management				
	Bachelor's degrees		61	0	12
	Masters degrees		12	20	17
			73	**20**	**29**

Career Path: 1.5 Natural Resources Systems Pathway

319999	Parks, Recreation, Leisure and Fitness Studies, Other			
	Bachelor's degrees	3	23	14
		3	**23**	**14**
	1.5 TOTAL SUPPLY	**253**	**164**	**182**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
171021	Cartographers and photogrammetrists Bachelor's degree	3
194041	Geological and petroleum technicians Associate degree	2
194093	Forest and conservation technicians Associate degree	17
333031	Fish and game wardens Associate degree	13
454011	Forest and conservation workers Moderate-term on-the-job training	15
454021	Fallers Moderate-term on-the-job training	11
454022	Logging equipment operators Moderate-term on-the-job training	11
454023	Log graders and scalers Moderate-term on-the-job training	3
475011	Derrick operators, oil and gas Moderate-term on-the-job training	0
475012	Rotary drill operators, oil and gas Moderate-term on-the-job training	1
475013	Service unit operators, oil, gas, and mining Moderate-term on-the-job training	2
475031	Explosives workers, ordnance handling experts, and blasters Moderate-term on-the-job training	3
475041	Continuous mining machine operators Moderate-term on-the-job training	1
475042	Mine cutting and channeling machine operators Moderate-term on-the-job training	2
475051	Rock splitters, quarry Moderate-term on-the-job training	2
475081	Helpers—Extraction workers Short-term on-the-job training	4
499092	Commercial divers Postsecondary vocational training	0
517041	Sawing machine setters, operators, and tenders, wood Moderate-term on-the-job training	35
518092	Gas plant operators Long-term on-the-job training	3
518093	Petroleum pump system operators, refinery operators, and gaugers Long-term on-the-job training	15
537033	Loading machine operators, underground mining Moderate-term on-the-job training	2
537071	Gas compressor and gas pumping station operators Moderate-term on-the-job training	1
537072	Pump operators, except wellhead pumpers Moderate-term on-the-job training	6
	1.5 TOTAL DEMAND	**152**

Career Path: **1.5 Natural Resources Systems Pathway**

SUPPLY:	**182**
DEMAND:	**152**
Demand minus Supply:	**-30**
Supply to Demand Ratio:	**1.20**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**182**
DEMAND:	**35**
Demand minus Supply:	**-147**
Supply to Demand Ratio:	**5.19**

Career Path: 1.6 Environmental Service Systems Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
150507	Environmental Engineering Technology/Environmental Technology				
	Awards of less than 1 academic year	Yes	1	0	0
	Associate degrees	Yes	2	0	0
	Bachelor's degrees	Yes	5	0	0
			8	**0**	**0**
	1.6 TOTAL SUPPLY		**8**	**0**	**0**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
172081	Environmental engineers Bachelor's degree	51
173025	Environmental engineering technicians Associate degree	17
194091	Environmental science and protection technicians, including health Associate degree	47
299011	Occupational health and safety specialists Bachelor's degree	27
299012	Occupational health and safety technicians Associate degree	7
372021	Pest control workers Moderate-term on-the-job training	70
518031	Water and liquid waste treatment plant and system operators Long-term on-the-job training	137
537081	Refuse and recyclable material collectors Short-term on-the-job training	137
	1.6 TOTAL DEMAND	**493**

SUPPLY:	**0**
DEMAND:	**493**
Demand minus Supply:	**493**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**0**
DEMAND:	**149**
Demand minus Supply:	**149**
Supply to Demand Ratio:	**0.00**

Career Path: **1.7 Agribusiness Systems Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131021	Purchasing agents and buyers, farm products Long-term on-the-job training	4
451012	Farm labor contractors Work experience in a related occupation	4
	1.7 TOTAL DEMAND	**8**

SUPPLY:	**0**
DEMAND:	**8**
Demand minus Supply:	**8**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: 2.1 Design/Pre-Construction Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
040201	Architecture (BArch, BA/BS, MArch, MA/MS, PhD)				
	Associate degrees		0	0	0
	Bachelor's degrees		52	60	54
	Masters degrees		10	13	9
			62	**73**	**63**
040401	Environmental Design/Architecture				
	Bachelor's degrees		4	32	19
			4	**32**	**19**
150101	Architectural Engineering Technology/Technician				
	Awards of less than 1 academic year	Yes	5	37	23
	Associate degrees	Yes	16	4	12
	Bachelor's degrees	Yes	4	0	0
			25	**41**	**35**
150201	Civil Engineering Technology/Technician				
	Associate degrees	Yes	14	0	4
			14	**0**	**4**
151102	Surveying Technology/Surveying				
	Bachelor's degrees	Yes	12	4	9
			12	**4**	**9**
151301	Drafting and Design Technology/Technician, General				
	Awards of less than 1 academic year	Yes	6	7	7
	Awards at least 1 but less than 2 academic years	Yes	8	13	16
	Associate degrees	Yes	78	0	0
			92	**20**	**23**
151302	CAD/CADD Drafting and/or Design Technology/Technician				
	Awards at least 1 but less than 2 academic years	Yes	3	7	5
	Associate degrees	Yes	32	116	102
			35	**123**	**107**
151303	Architectural Drafting and Architectural CAD/CADD				
	Associate degrees	Yes	0	1	1
			0	**1**	**1**
151306	Mechanical Drafting and Mechanical Drafting CAD/CADD				
	Awards at least 1 but less than 2 academic years	Yes	18	14	10
			18	**14**	**10**
151399	Drafting/Design Engineering Technologies/Technicians, Other				
	Associate degrees		11	0	0
	Awards at least 2 but less than 4 academic years		3	0	0
			13	**0**	**0**
	2.1 TOTAL SUPPLY		**275**	**308**	**270**

Career Path: 2.1 Design/Pre-Construction Pathway

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
171011	Architects, except landscape and naval Bachelor's degree	24

Career Path: 2.1 Design/Pre-Construction Pathway

SOC	Occupation	
171012	Landscape architects Bachelor's degree	3
171022	Surveyors Bachelor's degree	32
172051	Civil engineers Bachelor's degree	59
173013	Mechanical drafters Postsecondary vocational training	27
173022	Civil engineering technicians Associate degree	27
271025	Interior designers Associate degree	37
	2.1 TOTAL DEMAND	**209**

SUPPLY:	**270**
DEMAND:	**209**
Demand minus Supply:	**-61**
Supply to Demand Ratio:	**1.29**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**210**
DEMAND:	**182**
Demand minus Supply:	**-28**
Supply to Demand Ratio:	**1.15**

Career Path: 2.2 Construction Pathway

SUPPLY

			Average Graduates		
CIP	**Program**	**STEM**	**2000-08**	**2018**	**2008-18**
150501	Heating, Air Conditioning & Refrigeration Technology/Technician (ACH/ACR/ACHR/HRAC/HVAC/				
	Awards at least 1 but less than 2 academic years	Yes	10	72	51
	Associate degrees	Yes	13	92	64
			23	**164**	**115**
150503	Energy Management and Systems Technology/Technician				
	Associate degrees	Yes	2	0	0
			2	**0**	**0**
460302	Electrician				
	Awards of less than 1 academic year		23	36	29
	Awards at least 1 but less than 2 academic years		40	112	91
			63	**148**	**120**
469999	Construction Trades, Other				
	Awards of less than 1 academic year		0	1	1
			0	**1**	**1**
522001	Construction Management				
	Bachelor's degrees		4	36	23
			4	**36**	**23**
	2.2 TOTAL SUPPLY		**91**	**349**	**259**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119021	Construction managers Bachelor's degree	102
131051	Cost estimators Bachelor's degree	98
471011	First-line supervisors/managers of construction trades and extraction workers Work experience in a related occupation	216
472021	Brickmasons and blockmasons Long-term on-the-job training	51
472022	Stonemasons Long-term on-the-job training	5
472031	Carpenters Long-term on-the-job training	186
472041	Carpet installers Moderate-term on-the-job training	11
472042	Floor layers, except carpet, wood, and hard tiles Moderate-term on-the-job training	6
472043	Floor sanders and finishers Moderate-term on-the-job training	11
472044	Tile and marble setters Long-term on-the-job training	27
472051	Cement masons and concrete finishers Moderate-term on-the-job training	87
472053	Terrazzo workers and finishers Long-term on-the-job training	5
472061	Construction laborers Moderate-term on-the-job training	372

Career Path: 2.2 Construction Pathway

472071	Paving, surfacing, and tamping equipment operators Moderate-term on-the-job training	39
472072	Pile-driver operators Moderate-term on-the-job training	1
472073	Operating engineers and other construction equipment operators Moderate-term on-the-job training	194
472081	Drywall and ceiling tile installers Moderate-term on-the-job training	11
472082	Tapers Moderate-term on-the-job training	3
472111	Electricians Long-term on-the-job training	357
472121	Glaziers Long-term on-the-job training	67
472131	Insulation workers, floor, ceiling, and wall Moderate-term on-the-job training	47
472132	Insulation workers, mechanical Moderate-term on-the-job training	15
472141	Painters, construction and maintenance Moderate-term on-the-job training	94
472142	Paperhangers Moderate-term on-the-job training	0
472151	Pipelayers Short-term on-the-job training	87
472152	Plumbers, pipefitters, and steamfitters Long-term on-the-job training	178
472161	Plasterers and stucco masons Long-term on-the-job training	8
472171	Reinforcing iron and rebar workers Long-term on-the-job training	3
472181	Roofers Moderate-term on-the-job training	46
472211	Sheet metal workers Long-term on-the-job training	85
472221	Structural iron and steel workers Long-term on-the-job training	19
473011	Helpers—Brickmasons, blockmasons, stonemasons, and tile and marble setters Short-term on-the-job training	21
473012	Helpers—Carpenters Short-term on-the-job training	37
473013	Helpers—Electricians Short-term on-the-job training	53
473014	Helpers—Painters, paperhangers, plasterers, and stucco masons Short-term on-the-job training	7
473015	Helpers—Pipelayers, plumbers, pipefitters, and steamfitters Short-term on-the-job training	39
473016	Helpers—Roofers Short-term on-the-job training	9
474011	Construction and building inspectors Work experience in a related occupation	37
474021	Elevator installers and repairers Long-term on-the-job training	22
474031	Fence erectors Moderate-term on-the-job training	21
474041	Hazardous materials removal workers Moderate-term on-the-job training	38

Career Path: **2.2 Construction Pathway**

474071	Septic tank servicers and sewer pipe cleaners Moderate-term on-the-job training	19
474091	Segmental pavers Moderate-term on-the-job training	0
475021	Earth drillers, except oil and gas Moderate-term on-the-job training	5
492095	Electrical and electronics repairers, powerhouse, substation, and relay Postsecondary vocational training	3
499045	Refractory materials repairers, except brickmasons Moderate-term on-the-job training	1
499051	Electrical power-line installers and repairers Long-term on-the-job training	208
499095	Manufactured building and mobile home installers Moderate-term on-the-job training	2
499096	Riggers Short-term on-the-job training	4
499098	Helpers--Installation, maintenance, and repair workers Short-term on-the-job training	151
512041	Structural metal fabricators and fitters Moderate-term on-the-job training	56
537011	Conveyor operators and tenders Short-term on-the-job training	77
537021	Crane and tower operators Long-term on-the-job training	15
537031	Dredge operators Moderate-term on-the-job training	2
537032	Excavating and loading machine and dragline operators Moderate-term on-the-job training	54

2.2 TOTAL DEMAND	**3,312**

SUPPLY:	**259**
DEMAND:	**3,312**
Demand minus Supply:	**3,053**
Supply to Demand Ratio:	**0.08**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**88**
DEMAND:	**200**
Demand minus Supply:	**112**
Supply to Demand Ratio:	**0.44**

Career Path: 2.3 Maintenance/Operations Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
470201	Heating, Air Conditioning, Ventilation & Refrigeration Maintenance Technology/Technician				
	Awards at least 1 but less than 2 academic years		53	220	164
	Associate degrees		3	14	9
	Awards at least 2 but less than 4 academic years		23	10	10
			79	**244**	**182**
470302	Heavy Equipment Maintenance Technology/Technician				
	Awards at least 1 but less than 2 academic years		11	32	27
	Associate degrees		1	5	3
			12	**37**	**30**
	2.3 TOTAL SUPPLY		**91**	**281**	**213**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
373011	Landscaping and groundskeeping workers Short-term on-the-job training	329
474051	Highway maintenance workers Moderate-term on-the-job training	146
474099	Construction and related workers, all other Moderate-term on-the-job training	13
499011	Mechanical door repairers Moderate-term on-the-job training	6
499012	Control and valve installers and repairers, except mechanical door Moderate-term on-the-job training	19
499021	Heating, air conditioning, and refrigeration mechanics and installers Postsecondary vocational training	165
499031	Home appliance repairers Long-term on-the-job training	8
518021	Stationary engineers and boiler operators Long-term on-the-job training	11
	2.3 TOTAL DEMAND	**697**

SUPPLY:	**213**
DEMAND:	**697**
Demand minus Supply:	**484**
Supply to Demand Ratio:	**0.31**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**21**
Demand minus Supply:	**-21**
Supply to Demand Ratio:	**-**

Career Path: 3.1 Audio and Video Technology and Film Pathway

<div style="background-color:#d5f5d5;">SUPPLY</div>

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
301401	Museology/Museum Studies				
	Bachelor's degrees		1	0	1
	Postbaccalaureate certificates		1	11	6
			2	**11**	**7**
500401	Design and Visual Communications, General				
	Bachelor's degrees		14	8	12
	Masters degrees		2	0	0
			16	**8**	**12**
500605	Photography				
	Awards of less than 1 academic year		14	0	4
	Associate degrees		2	9	6
	Bachelor's degrees		8	13	14
			24	**22**	**23**
500701	Art/Art Studies, General				
	Bachelor's degrees		230	281	276
	Masters degrees		14	18	16
			244	**299**	**292**
500702	Fine/Studio Arts, General				
	Associate degrees		3	0	0
	Bachelor's degrees		145	342	274
	Masters degrees		16	35	28
			164	**377**	**303**
500703	Art History, Criticism and Conservation				
	Bachelor's degrees		33	46	41
	Masters degrees		7	7	6
			40	**53**	**47**
500708	Painting				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
500799	Fine Arts and Art Studies, Other				
	Bachelor's degrees		6	0	0
	Masters degrees		4	0	0
			9	**0**	**0**
	3.1 TOTAL SUPPLY		**500**	**771**	**685**

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SOC	Occupation	Average Annual Openings, 2008-18
271024	Graphic designers	174
	Bachelor's degree	
274011	Audio and video equipment technicians	30
	Postsecondary vocational training	
274014	Sound engineering technicians	12
	Postsecondary vocational training	
499061	Camera and photographic equipment repairers	4
	Long-term on-the-job training	
	3.1 TOTAL DEMAND	**220**

Career Path:　　**3.1 Audio and Video Technology and Film Pathway**

SUPPLY:	**685**
DEMAND:	**220**
Demand minus Supply:	**-465**
Supply to Demand Ratio:	**3.11**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**681**
DEMAND:	**174**
Demand minus Supply:	**-507**
Supply to Demand Ratio:	**3.91**

Career Path: **3.2 Printing Technology Pathway**

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
100304	Animation, Interactive Technology, Video Graphics & Special Effects				
	Bachelor's degrees		27	144	101
			27	**144**	**101**
	3.2 TOTAL SUPPLY		**27**	**144**	**101**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
439031	Desktop publishers	10
	Postsecondary vocational training	
515011	Bindery workers	21
	Short-term on-the-job training	
515012	Bookbinders	1
	Moderate-term on-the-job training	
515021	Job printers	3
	Long-term on-the-job training	
515022	Prepress technicians and workers	16
	Postsecondary vocational training	
515023	Printing machine operators	106
	Moderate-term on-the-job training	
	3.2 TOTAL DEMAND	**157**

SUPPLY:	**101**
DEMAND:	**157**
Demand minus Supply:	**56**
Supply to Demand Ratio:	**0.64**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**101**
Demand minus Supply:	**-101**
Supply to Demand Ratio:	**-**

Career Path: 3.3 Visual Arts Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
500101	Visual and Performing Arts, General				
	Bachelor's degrees		33	63	53
			33	**63**	**53**
500402	Commercial and Advertising Art				
	Associate degrees		145	55	97
	Bachelor's degrees		46	38	29
			191	**93**	**126**
500406	Commercial Photography				
	Associate degrees		17	90	68
			17	**90**	**68**
500408	Interior Design				
	Associate degrees		35	99	79
	Bachelor's degrees		64	155	123
			99	**254**	**201**
500409	Graphic Design				
	Associate degrees		7	64	39
	Bachelor's degrees		11	82	60
	Postbaccalaureate certificates		1	9	5
			19	**155**	**103**
	3.3 TOTAL SUPPLY		**359**	**655**	**551**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
271012	Craft artists	12
	Long-term on-the-job training	
271013	Fine artists, including painters, sculptors, and illustrators	3
	Long-term on-the-job training	
271014	Multi-media artists and animators	17
	Bachelor's degree	
271021	Commercial and industrial designers	24
	Bachelor's degree	
274021	Photographers	88
	Long-term on-the-job training	
	3.3 TOTAL DEMAND	**144**

SUPPLY:	**551**
DEMAND:	**144**
Demand minus Supply:	**-407**
Supply to Demand Ratio:	**3.83**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**551**
DEMAND:	**41**
Demand minus Supply:	**-510**
Supply to Demand Ratio:	**13.45**

Career Path: 3.4 Performing Arts Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
500501	Drama and Dramatics/Theatre Arts, General				
	Associate degrees		0	1	1
	Bachelor's degrees		185	163	156
	Masters degrees		11	12	14
			196	**176**	**171**
500502	Technical Theatre/Theatre Design and Technology				
	Bachelor's degrees		0	0	1
			0	**0**	**1**
500506	Acting				
	Bachelor's degrees		1	9	6
			1	**9**	**6**
500508	Theatre/Theatre Arts Management				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
500599	Dramatic/Theatre Arts and Stagecraft, Other				
	Bachelor's degrees		2	0	0
			2	**0**	**0**
500601	Film/Cinema Studies				
	Bachelor's degrees		2	19	11
			2	**19**	**11**
500602	Cinematography and Film/Video Production				
	Awards of less than 1 academic year		0	0	1
	Associate degrees		12	3	7
	Bachelor's degrees		19	62	43
	Postbaccalaureate certificates		3	0	0
			34	**65**	**50**
500901	Music, General				
	Associate degrees		2	0	0
	Bachelor's degrees		208	120	178
	Masters degrees		66	113	102
	Doctoral degrees		6	10	10
			282	**243**	**290**
500902	Music History, Literature, and Theory				
	Bachelor's degrees		8	0	0
			8	**0**	**0**
500903	Music Performance, General				
	Awards at least 1 but less than 2 academic years		1	11	6
	Bachelor's degrees		67	199	166
	Masters degrees		4	1	1
			72	**211**	**173**
500904	Music Theory and Composition				
	Bachelor's degrees		5	11	7
			5	**11**	**7**

Career Path: 3.4 Performing Arts Pathway

500907	Piano and Organ			
	Bachelor's degrees	2	6	5
		2	**6**	**5**
500908	Voice and Opera			
	Bachelor's degrees	3	9	5
		3	**9**	**5**
500909	Music Management and Merchandising			
	Awards at least 1 but less than 2 academic years	0	2	1
	Bachelor's degrees	436	882	715
		436	**884**	**716**
500911	Violin, Viola, Guitar and Other Stringed Instruments			
	Bachelor's degrees	3	23	15
		3	**23**	**15**
500912	Music Pedagogy			
	Bachelor's degrees	1	0	1
	Masters degrees	1	4	3
		1	**4**	**4**
500999	Music, Other			
	Awards at least 1 but less than 2 academic years	20	45	39
	Bachelor's degrees	35	128	93
	Masters degrees	5	6	9
		60	**179**	**141**
509999	Visual and Performing Arts, Other			
	Awards at least 1 but less than 2 academic years	0	0	0
	Bachelor's degrees	1	0	0
	Masters degrees	3	0	0
		5	**0**	**0**
	3.4 TOTAL SUPPLY	**1,113**	**1,840**	**1,596**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
272011	Actors	12
	Long-term on-the-job training	
272012	Producers and directors	36
	Bachelor's or higher degree, plus work experience	
272031	Dancers	8
	Long-term on-the-job training	
272032	Choreographers	10
	Work experience in a related occupation	
272041	Music directors and composers	65
	Bachelor's or higher degree, plus work experience	
272099	Entertainers and performers, sports and related workers, all other	188
	Long-term on-the-job training	
273012	Public address system and other announcers	4
	Moderate-term on-the-job training	
273043	Writers and authors	88
	Bachelor's degree	
274031	Camera operators, television, video, and motion picture	13
	Bachelor's degree	

Career Path: **3.4 Performing Arts Pathway**

274032	Film and video editors	11
	Bachelor's degree	
395091	Makeup artists, theatrical and performance	0
	Postsecondary vocational training	

3.4 TOTAL DEMAND	**435**

SUPPLY:	**1,596**
DEMAND:	**435**
Demand minus Supply:	**-1,161**
Supply to Demand Ratio:	**3.67**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,549**
DEMAND:	**213**
Demand minus Supply:	**-1,336**
Supply to Demand Ratio:	**7.27**

Career Path: **3.5 Journalism and Broadcasting Pathway**

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
090101	Communication Studies/Speech Communication and Rhetoric				
	Associate degrees		1	0	0
	Bachelor's degrees		219	497	402
	Masters degrees		31	24	28
	Doctoral degrees		6	3	2
			257	**524**	**433**
090102	Mass Communication/Media Studies				
	Associate degrees		1	5	3
	Bachelor's degrees		477	951	783
	Masters degrees		28	58	46
	Doctoral degrees		3	12	8
			509	**1,026**	**840**
090199	Communication and Media Studies, Other				
	Bachelor's degrees		22	62	56
			22	**62**	**56**
090401	Journalism				
	Bachelor's degrees		200	0	79
	Masters degrees		16	0	9
			216	**0**	**89**
090402	Broadcast Journalism				
	Bachelor's degrees		23	19	21
			23	**19**	**21**
090499	Journalism, Other				
	Associate degrees		0	0	0
	Bachelor's degrees		47	337	229
			47	**337**	**229**
090701	Radio and Television				
	Awards at least 1 but less than 2 academic years		1	0	0
	Associate degrees		1	0	0
	Bachelor's degrees		69	0	1
			71	**0**	**1**
090702	Digital Communication and Media/Multimedia				
	Awards at least 1 but less than 2 academic years		0	2	1
	Bachelor's degrees		9	88	54
			9	**90**	**55**
090799	Radio, Television, and Digital Communication, Other				
	Bachelor's degrees		5	12	9
			5	**12**	**9**
099999	Communication, Journalism, and Related Programs, Other				
	Associate degrees		0	2	2
	Bachelor's degrees		16	49	40
			16	**51**	**42**

Career Path: 3.5 Journalism and Broadcasting Pathway

100202	Radio and Television Broadcasting Technology/Technician			
	Associate degrees	0	0	0
		0	**0**	**0**
100203	Recording Arts Technology/Technician			
	Bachelor's degrees	3	25	20
	Masters degrees	1	3	5
		4	**28**	**26**
230401	English Composition			
	Bachelor's degrees	5	0	0
		5	**0**	**0**
230501	Creative Writing			
	Bachelor's degrees	1	9	5
	Masters degrees	9	19	16
		10	**28**	**21**
231101	Technical and Business Writing			
	Awards of less than 1 academic year	0	0	1
	Bachelor's degrees	6	7	8
		6	**7**	**8**
	3.5 TOTAL SUPPLY	**1,202**	**2,184**	**1,831**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
273011	Radio and television announcers	51
	Long-term on-the-job training	
273021	Broadcast news analysts	3
	Bachelor's degree	
273022	Reporters and correspondents	54
	Bachelor's degree	
273041	Editors	62
	Bachelor's degree	
274012	Broadcast technicians	25
	Associate degree	
274013	Radio operators	0
	Moderate-term on-the-job training	
	3.5 TOTAL DEMAND	**195**

SUPPLY:	**1,831**
DEMAND:	**195**
Demand minus Supply:	**-1,636**
Supply to Demand Ratio:	**9.39**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,829**
DEMAND:	**144**
Demand minus Supply:	**-1,685**
Supply to Demand Ratio:	**12.70**

Career Path: **3.6 Telecommunications Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
100105	Communications Technology/Technician				
	Associate degrees		3	11	17
	Bachelor's degrees		0	2	1
			3	**13**	**18**
109999	Communications Technologies/Technicians & Support Services, Other				
	Associate degrees		0	1	1
			0	**1**	**1**
470103	Communications Systems Installation and Repair Technology				
	Bachelor's degrees		1	5	3
			1	**5**	**3**
	3.6 TOTAL SUPPLY		**4**	**19**	**21**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
499052	Telecommunications line installers and repairers	44
	Long-term on-the-job training	
	3.6 TOTAL DEMAND	**44**

SUPPLY:	**21**
DEMAND:	**44**
Demand minus Supply:	**23**
Supply to Demand Ratio:	**0.49**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**21**
Demand minus Supply:	**-21**
Supply to Demand Ratio:	**-**

Career Path: 4.1 Management Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
090901	Organizational Communication, General				
	Bachelor's degrees		3	18	13
			3	**18**	**13**
090902	Public Relations/Image Management				
	Bachelor's degrees		60	75	84
			60	**75**	**84**
520101	Business/Commerce, General				
	Awards of less than 1 academic year		4	0	6
	Awards at least 1 but less than 2 academic years		1	3	4
	Associate degrees		47	0	20
	Bachelor's degrees		389	0	107
	Masters degrees		74	10	11
			516	**13**	**149**
520201	Business Administration and Management, General				
	Awards of less than 1 academic year		11	0	3
	Awards at least 1 but less than 2 academic years		4	8	6
	Associate degrees		524	524	507
	Bachelor's degrees		2,175	4,034	3,503
	Postbaccalaureate certificates		4	14	7
	Masters degrees		1,357	1,775	1,665
	Doctoral degrees		19	37	27
			4,092	**6,392**	**5,718**
520203	Logistics and Materials Management				
	Awards of less than 1 academic year		1	2	3
	Awards at least 1 but less than 2 academic years		5	29	20
	Bachelor's degrees		143	66	104
			149	**97**	**127**
520204	Office Management and Supervision				
	Awards of less than 1 academic year		27	0	0
	Associate degrees		10	92	53
	Bachelor's degrees		51	0	20
			88	**92**	**73**
520205	Operations Management and Supervision				
	Bachelor's degrees		19	0	9
	Masters degrees		11	0	7
			29	**0**	**16**
520601	Business/Managerial Economics				
	Bachelor's degrees		122	171	153
	Masters degrees		5	8	7
	Doctoral degrees		3	0	0
			131	**179**	**160**

Career Path: 4.1 Management Pathway

520701	Entrepreneurship/Entrepreneurial Studies			
	Awards of less than 1 academic year	0	2	1
	Awards at least 1 but less than 2 academic years	0	3	2
	Bachelor's degrees	17	125	80
	Postbaccalaureate certificates	1	2	2
	Masters degrees	12	24	19
		30	**156**	**105**
520799	Entrepreneurial and Small Business Operations, Other			
	Bachelor's degrees	7	60	40
		7	**60**	**40**
521101	International Business/Trade/Commerce			
	Bachelor's degrees	32	83	64
	Masters degrees	8	30	24
		40	**113**	**88**
521301	Management Science, General			
	Bachelor's degrees	95	0	0
	Masters degrees	41	0	0
	Doctoral degrees	2	5	4
		137	**5**	**4**
	4.1 TOTAL SUPPLY	**5,283**	**7,200**	**6,576**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
111021	General and operations managers Bachelor's or higher degree, plus work experience	1,208
112031	Public relations managers Bachelor's or higher degree, plus work experience	41
113011	Administrative services managers Bachelor's or higher degree, plus work experience	222
113061	Purchasing managers Bachelor's or higher degree, plus work experience	51
119111	Medical and health services managers Bachelor's or higher degree, plus work experience	238
119199	Managers, all other Work experience in a related occupation	460
131011	Agents and business managers of artists, performers, and athletes Bachelor's or higher degree, plus work experience	122
	4.1 TOTAL DEMAND	**2,342**

SUPPLY:	**6,576**
DEMAND:	**2,342**
Demand minus Supply:	**-4,234**
Supply to Demand Ratio:	**2.81**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**6,532**
DEMAND:	**1,882**
Demand minus Supply:	**-4,650**
Supply to Demand Ratio:	**3.47**

Career Path: **4.2 Business Financial Management and Accounting Pathway**

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
520299	Business Administration, Management and Operations, Other				
	Awards at least 1 but less than 2 academic years		0	0	1
	Associate degrees		75	96	85
	Bachelor's degrees		106	60	57
	Masters degrees		79	0	18
			259	**156**	**161**
520301	Accounting				
	Awards of less than 1 academic year		0	0	1
	Awards at least 1 but less than 2 academic years		5	21	13
	Associate degrees		28	28	31
	Bachelor's degrees		718	576	625
	Postbaccalaureate certificates		0	0	1
	Masters degrees		173	257	224
			924	**882**	**894**
520302	Accounting Technology/Technician and Bookkeeping				
	Awards of less than 1 academic year		10	43	32
	Awards at least 1 but less than 2 academic years		31	23	22
	Associate degrees		98	70	75
			139	**136**	**128**
520304	Accounting and Finance				
	Bachelor's degrees		0	0	1
			0	**0**	**1**
520305	Accounting and Business/Management				
	Associate degrees		1	4	3
	Bachelor's degrees		7	39	25
			8	**43**	**28**
520399	Accounting and Related Services, Other				
	Awards of less than 1 academic year		5	0	2
	Awards at least 1 but less than 2 academic years		1	2	2
	Associate degrees		0	0	0
	Masters degrees		34	55	48
			41	**57**	**51**
	4.2 TOTAL SUPPLY		**1,371**	**1,274**	**1,263**

SOC	Occupation	Average Annual Openings, 2008-18
111011	Chief executives	401
	Bachelor's or higher degree, plus work experience	
113031	Financial managers	284
	Bachelor's or higher degree, plus work experience	
132011	Accountants and auditors	691
	Bachelor's degree	
433031	Bookkeeping, accounting, and auditing clerks	641
	Moderate-term on-the-job training	
433051	Payroll and timekeeping clerks	90
	Moderate-term on-the-job training	
	4.2 TOTAL DEMAND	**2,107**

Career Path: 4.2 Business Financial Management and Accounting Pathway

SUPPLY:	**1,263**
DEMAND:	**2,107**
Demand minus Supply:	**844**
Supply to Demand Ratio:	**0.60**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,192**
DEMAND:	**1,376**
Demand minus Supply:	**184**
Supply to Demand Ratio:	**0.87**

Career Path: 4.3 Human Resources Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
521001	Human Resources Management/Personnel Administration, General				
	Bachelor's degrees		21	37	31
	Masters degrees		26	36	25
	Doctoral degrees		2	0	0
			48	**73**	**56**
521003	Organizational Behavior Studies				
	Masters degrees		16	102	68
			16	**102**	**68**
521005	Human Resources Development				
	Masters degrees		3	23	14
	Doctoral degrees		1	3	3
			4	**26**	**16**
521099	Human Resources Management and Services, Other				
	Bachelor's degrees		5	0	0
			5	**0**	**0**
	4.3 TOTAL SUPPLY		**73**	**201**	**140**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
113041	Compensation and benefits managers Bachelor's or higher degree, plus work experience	91
113042	Training and development managers Bachelor's or higher degree, plus work experience	27
113049	Human resources managers, all other Bachelor's or higher degree, plus work experience	24
131072	Compensation, benefits, and job analysis specialists Bachelor's degree	65
131073	Training and development specialists Bachelor's degree	163
131079	Human resources, training, and labor relations specialists, all other Bachelor's degree	77
434161	Human resources assistants, except payroll and timekeeping Short-term on-the-job training	109
	4.3 TOTAL DEMAND	**556**

SUPPLY:	**140**
DEMAND:	**556**
Demand minus Supply:	**416**
Supply to Demand Ratio:	**0.25**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**140**
DEMAND:	**447**
Demand minus Supply:	**307**
Supply to Demand Ratio:	**0.31**

Career Path: **4.4 Business Analysis Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
521201	Management Information Systems, General				
	Awards of less than 1 academic year		6	0	0
	Associate degrees		216	0	37
	Bachelor's degrees		244	16	113
	Masters degrees		10	60	36
			476	**76**	**185**
521299	Management Information Systems and Services, Other				
	Awards of less than 1 academic year		8	0	2
	Associate degrees		1	0	0
	Masters degrees		6	0	0
			15	**0**	**2**
	4.4 TOTAL SUPPLY		**491**	**76**	**187**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131111	Management analysts	166
	Bachelor's or higher degree, plus work experience	
132031	Budget analysts	19
	Bachelor's degree	
152031	Operations research analysts	29
	Master's degree	
	4.4 TOTAL DEMAND	**214**

SUPPLY:	**187**
DEMAND:	**214**
Demand minus Supply:	**27**
Supply to Demand Ratio:	**0.88**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**185**
DEMAND:	**214**
Demand minus Supply:	**29**
Supply to Demand Ratio:	**0.87**

Career Path: **4.5 Marketing**

SUPPLY

			Average Graduates		
CIP	**Program**	**STEM**	**2000-08**	**2018**	**2008-18**
090999	Public Relations, Advertising & Applied Communication, Other				
	Bachelor's degrees		9	53	37
			9	**53**	**37**
	4.5 TOTAL SUPPLY		**9**	**53**	**37**

DEMAND

SOC	**Occupation**	**Average Annual Openings, 2008-18**
112011	Advertising and promotions managers	26
	Bachelor's or higher degree, plus work experience	
112021	Marketing managers	95
	Bachelor's or higher degree, plus work experience	
112022	Sales managers	249
	Bachelor's or higher degree, plus work experience	
271011	Art directors	27
	Bachelor's or higher degree, plus work experience	
413011	Advertising sales agents	59
	Moderate-term on-the-job training	
533031	Driver/sales workers	194
	Short-term on-the-job training	
	4.5 TOTAL DEMAND	**650**

SUPPLY:	**37**
DEMAND:	**650**
Demand minus Supply:	**613**
Supply to Demand Ratio:	**0.06**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**37**
DEMAND:	**397**
Demand minus Supply:	**360**
Supply to Demand Ratio:	**0.09**

Career Path: 4.6 Administrative and Information Support Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
110601	Data Entry/Microcomputer Applications, General				
	Awards of less than 1 academic year		1	9	5
			1	**9**	**5**
110699	Data Entry/Microcomputer Applications, Other				
	Awards of less than 1 academic year		0	0	0
	Awards at least 1 but less than 2 academic years		2	16	9
			2	**16**	**9**
520401	Administrative Assistant and Secretarial Science, General				
	Awards of less than 1 academic year		30	0	6
	Awards at least 1 but less than 2 academic years		71	0	9
	Associate degrees		165	76	98
	Bachelor's degrees		10	0	1
			276	**76**	**114**
520402	Executive Assistant/Executive Secretary				
	Associate degrees		2	0	0
			2	**0**	**0**
520407	Business/Office Automation/Technology/Data Entry				
	Awards of less than 1 academic year		11	18	16
	Awards at least 1 but less than 2 academic years		2	0	0
	Associate degrees		6	17	14
			19	**35**	**29**
520408	General Office Occupations and Clerical Services				
	Awards of less than 1 academic year		8	0	0
	Awards at least 1 but less than 2 academic years		5	27	17
			13	**27**	**17**
520499	Business Operations Support and Secretarial Services, Other				
	Awards at least 1 but less than 2 academic years		0	0	0
			0	**0**	**0**
	4.6 TOTAL SUPPLY		**313**	**163**	**174**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
232091	Court reporters	0
	Postsecondary vocational training	
273031	Public relations specialists	111
	Bachelor's degree	
431011	First-line supervisors/managers of office and administrative support workers	1,031
	Work experience in a related occupation	
432021	Telephone operators	5
	Short-term on-the-job training	
434021	Correspondence clerks	11
	Short-term on-the-job training	
434071	File clerks	70
	Short-term on-the-job training	
434121	Library assistants, clerical	74
	Short-term on-the-job training	

Career Path: 4.6 Administrative and Information Support Pathway

434141	New accounts clerks	34
	Work experience in a related occupation	
434171	Receptionists and information clerks	725
	Short-term on-the-job training	
435021	Couriers and messengers	40
	Short-term on-the-job training	
435081	Stock clerks and order fillers	1,155
	Short-term on-the-job training	
436011	Executive secretaries and administrative assistants	664
	Work experience in a related occupation	
436012	Legal secretaries	70
	Associate degree	
436013	Medical secretaries	187
	Moderate-term on-the-job training	
436014	Secretaries, except legal, medical, and executive	541
	Moderate-term on-the-job training	
439011	Computer operators	29
	Moderate-term on-the-job training	
439021	Data entry keyers	132
	Moderate-term on-the-job training	
439022	Word processors and typists	7
	Moderate-term on-the-job training	
439051	Mail clerks and mail machine operators, except postal service	39
	Short-term on-the-job training	
439199	Office and administrative support workers, all other	78
	Short-term on-the-job training	

4.6 TOTAL DEMAND		**5,003**

SUPPLY:	**174**
DEMAND:	**5,003**
Demand minus Supply:	**4,829**
Supply to Demand Ratio:	**0.03**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**113**
DEMAND:	**181**
Demand minus Supply:	**68**
Supply to Demand Ratio:	**0.62**

Career Path: 5.1 Administrative and Information Support Pathway

			Average Graduates		
CIP	**Program**	**STEM**	**2000-08**	**2018**	**2008-18**
130401	Educational Leadership and Administration, General				
	Masters degrees		710	1,313	1,077
	Post-Masters certificates		271	963	716
	Doctoral degrees		83	119	96
			1,064	**2,395**	**1,890**
130404	Educational, Instructional, and Curriculum Supervision				
	Masters degrees		2	18	11
	Post-Masters certificates		2	0	0
	Doctoral degrees		0	4	2
			5	**22**	**13**
130406	Higher Education/Higher Education Administration				
	Masters degrees		15	25	20
	Doctoral degrees		13	43	29
			28	**68**	**49**
130407	Community College Education				
	Postbaccalaureate certificates		1	9	5
			1	**9**	**5**
130408	Elementary & Middle School Administration/Principalship				
	Masters degrees		10	0	0
			10	**0**	**0**
130499	Educational Administration and Supervision, Other				
	Masters degrees		99	67	94
	Post-Masters certificates		574	1,682	1,257
			673	**1,749**	**1,351**
130501	Educational/Instructional Media Design				
	Postbaccalaureate certificates		3	1	0
	Masters degrees		16	38	30
	Post-Masters certificates		7	0	3
			26	**39**	**33**
130601	Educational Evaluation and Research				
	Masters degrees		0	0	0
			0	**0**	**0**
130701	International and Comparative Education				
	Masters degrees		1	12	7
			1	**12**	**7**
310504	Sport and Fitness Administration/Management				
	Bachelor's degrees		126	306	251
	Masters degrees		16	72	52
			141	**378**	**302**
	5.1 TOTAL SUPPLY		**1,950**	**4,672**	**3,651**

Career Path: **5.1 Administrative and Information Support Pathway**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18

Career Path: **5.1 Administrative and Information Support Pathway**

SOC	Occupation	
119031	Education administrators, preschool and child care center/program Bachelor's or higher degree, plus work experience	52
119032	Education administrators, elementary and secondary school Bachelor's or higher degree, plus work experience	194
119033	Education administrators, postsecondary Bachelor's or higher degree, plus work experience	53
259031	Instructional coordinators Master's degree	72
	5.1 TOTAL DEMAND	**371**

SUPPLY:	**3,651**
DEMAND:	**371**
Demand minus Supply:	**-3,280**
Supply to Demand Ratio:	**9.84**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**3,651**
DEMAND:	**371**
Demand minus Supply:	**-3,280**
Supply to Demand Ratio:	**9.84**

Career Path: 5.2 Professional Support Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
131101	Counselor Education/School Counseling and Guidance Services				
	Postbaccalaureate certificates		3	0	1
	Masters degrees		213	329	259
	Post-Masters certificates		16	12	14
	Doctoral degrees		2	8	4
			234	**349**	**278**
131102	College Student Counseling and Personnel Services				
	Masters degrees		13	24	17
			13	**24**	**17**
250101	Library Science/Librarianship				
	Masters degrees		82	134	120
			82	**134**	**120**
250301	Library Assistant				
	Awards of less than 1 academic year		0	1	2
			0	**1**	**2**
	5.2 TOTAL SUPPLY		**329**	**508**	**417**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
193031	Clinical, counseling, and school psychologists Doctoral degree	97
211012	Educational, vocational, and school counselors Master's degree	169
254021	Librarians Master's degree	116
254031	Library technicians Postsecondary vocational training	80
259011	Audio-visual collections specialists Bachelor's degree	2
	5.2 TOTAL DEMAND	**464**

SUPPLY:	**417**
DEMAND:	**464**
Demand minus Supply:	**47**
Supply to Demand Ratio:	**0.90**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**415**
DEMAND:	**384**
Demand minus Supply:	**-31**
Supply to Demand Ratio:	**1.08**

Career Path: **5.3 Teaching/Training Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
130101	Education, General				
	Associate degrees		9	16	29
	Bachelor's degrees		70	197	142
	Postbaccalaureate certificates		2	11	6
	Masters degrees		629	352	462
	Post-Masters certificates		39	0	17
	Doctoral degrees		41	0	12
			788	**576**	**668**
130201	Bilingual and Multilingual Education				
	Masters degrees		1	0	0
			1	**0**	**0**
130301	Curriculum and Instruction				
	Masters degrees		640	783	700
	Post-Masters certificates		122	171	149
	Doctoral degrees		27	31	24
			788	**985**	**872**
131001	Special Education and Teaching, General				
	Bachelor's degrees		199	161	167
	Masters degrees		116	142	129
	Doctoral degrees		3	25	15
			318	**328**	**311**
131003	Education/Teaching of Individuals with Hearing Impairments, Including Deafness				
	Masters degrees		0	1	2
			0	**1**	**2**
131011	Education/Teaching of Individuals with Specific Learning Disabilities				
	Bachelor's degrees		1	0	1
			1	**0**	**1**
131012	Education/Teaching of Individuals with Speech or Language Impairments				
	Bachelor's degrees		0	0	0
			0	**0**	**0**
131015	Education/Teaching of Individuals in Early Childhood Special Education Programs				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
131099	Special Education and Teaching, Other				
	Bachelor's degrees		9	25	20
	Masters degrees		1	0	1
			10	**25**	**20**
131201	Adult and Continuing Education and Teaching				
	Masters degrees		19	116	70
			19	**116**	**70**

Career Path: 5.3 Teaching/Training Pathway

131202	Elementary Education and Teaching			
	Awards at least 1 but less than 2 academic years	1	10	6
	Associate degrees	5	8	6
	Bachelor's degrees	349	619	513
	Postbaccalaureate certificates	21	178	115
	Masters degrees	179	485	355
		555	**1,300**	**995**
131203	Junior High/Intermediate/Middle School Education & Teaching			
	Bachelor's degrees	15	69	48
	Postbaccalaureate certificates	1	4	4
		16	**73**	**52**
131205	Secondary Education and Teaching			
	Associate degrees	3	3	4
	Bachelor's degrees	66	96	88
	Postbaccalaureate certificates	0	1	1
	Masters degrees	126	274	256
		196	**374**	**349**
131206	Teacher Education, Multiple Levels			
	Bachelor's degrees	145	483	378
	Postbaccalaureate certificates	6	22	18
	Masters degrees	91	314	220
		242	**819**	**617**
131209	Kindergarten/Preschool Education and Teaching			
	Bachelor's degrees	32	0	0
	Masters degrees	5	0	0
		37	**0**	**0**
131210	Early Childhood Education and Teaching			
	Associate degrees	1	6	3
	Bachelor's degrees	70	275	225
	Masters degrees	14	34	36
	Doctoral degrees	0	1	1
		84	**316**	**266**
131299	Teacher Education & Professional Development, Specific Levels & Methods, Other			
	Bachelor's degrees	27	0	0
	Postbaccalaureate certificates	2	0	0
	Masters degrees	28	0	1
	Post-Masters certificates	5	43	27
	Doctoral degrees	2	4	5
		63	**47**	**32**
131301	Agricultural Teacher Education			
	Bachelor's degrees	10	10	9
	Masters degrees	8	6	6
		18	**16**	**14**
131302	Art Teacher Education			
	Bachelor's degrees	20	59	42
		20	**59**	**42**

Career Path: **5.3 Teaching/Training Pathway**

131303	Business Teacher Education			
	Bachelor's degrees	24	44	34
	Masters degrees	15	25	21
		39	**69**	**55**
131304	Driver and Safety Teacher Education			
	Masters degrees	3	0	1
	Post-Masters certificates	0	0	0
		3	**0**	**1**
131305	English/Language Arts Teacher Education			
	Bachelor's degrees	38	86	63
	Postbaccalaureate certificates	1	5	3
	Masters degrees	3	4	4
	Doctoral degrees	0	0	0
		41	**95**	**71**
131306	Foreign Language Teacher Education			
	Bachelor's degrees	0	2	1
	Masters degrees	7	19	13
		7	**21**	**14**
131307	Health Teacher Education			
	Bachelor's degrees	41	102	75
	Masters degrees	3	0	0
	Doctoral degrees	0	0	0
		44	**102**	**75**
131308	Family & Consumer Sciences/Home Economics Teacher Education			
	Bachelor's degrees	2	23	13
	Masters degrees	3	0	0
		5	**23**	**13**
131309	Technology Teacher Education/Industrial Arts Teacher Education			
	Associate degrees	4	15	12
	Bachelor's degrees	7	0	0
	Masters degrees	2	11	9
		13	**26**	**21**
131310	Sales & Marketing Operations/Marketing & Distribution Teacher Education			
	Bachelor's degrees	1	0	0
		1	**0**	**0**
131311	Mathematics Teacher Education			
	Bachelor's degrees	20	38	31
	Postbaccalaureate certificates	0	0	1
	Masters degrees	5	9	7
	Doctoral degrees	0	1	0
		26	**48**	**38**
131312	Music Teacher Education			
	Associate degrees	0	1	1
	Bachelor's degrees	49	50	46
	Masters degrees	8	17	17
		58	**68**	**64**

Career Path: **5.3 Teaching/Training Pathway**

131314	Physical Education Teaching and Coaching			
	Bachelor's degrees	80	102	83
		80	**102**	**83**
131315	Reading Teacher Education			
	Postbaccalaureate certificates	1	3	2
	Masters degrees	41	55	61
	Doctoral degrees	0	0	0
		42	**58**	**63**
131316	Science Teacher Education/General Science Teacher Education			
	Bachelor's degrees	6	12	10
	Masters degrees	1	0	0
	Doctoral degrees	0	1	0
		7	**13**	**10**
131318	Social Studies Teacher Education			
	Bachelor's degrees	21	29	27
	Masters degrees	0	0	0
		21	**29**	**27**
131319	Technical Teacher Education			
	Bachelor's degrees	31	0	7
	Masters degrees	20	0	0
		50	**0**	**7**
131322	Biology Teacher Education			
	Bachelor's degrees	8	0	0
	Postbaccalaureate certificates	0	2	2
	Masters degrees	2	0	0
		10	**2**	**3**
131323	Chemistry Teacher Education			
	Bachelor's degrees	0	0	0
		0	**0**	**0**
131324	Drama and Dance Teacher Education			
	Bachelor's degrees	0	2	1
		0	**2**	**1**
131325	French Language Teacher Education			
	Bachelor's degrees	1	1	3
		1	**1**	**3**
131326	German Language Teacher Education			
	Bachelor's degrees	0	0	0
		0	**0**	**0**
131327	Health Occupations Teacher Education			
	Masters degrees	1	6	6
		1	**6**	**6**
131328	History Teacher Education			
	Bachelor's degrees	28	73	57
	Postbaccalaureate certificates	0	4	2
		28	**77**	**59**

Career Path: 5.3 Teaching/Training Pathway

131330	Spanish Language Teacher Education			
	Bachelor's degrees	4	10	8
		4	**10**	**8**
131331	Speech Teacher Education			
	Bachelor's degrees	0	2	1
		0	**2**	**1**
131332	Geography Teacher Education			
	Bachelor's degrees	1	7	5
		1	**7**	**5**
131335	Psychology Teacher Education			
	Bachelor's degrees	1	5	4
		1	**5**	**4**
131399	Teacher Education & Professional Development, Specific Subject Areas, Other			
	Bachelor's degrees	8	0	0
	Masters degrees	5	6	8
		14	**6**	**8**
131401	Teaching English as a Second or Foreign Language/ESL Language Instructor			
	Bachelor's degrees	5	11	11
	Postbaccalaureate certificates	0	1	1
	Masters degrees	24	41	38
		28	**53**	**51**
139999	Education, Other			
	Bachelor's degrees	84	0	9
	Masters degrees	18	0	0
	Doctoral degrees	16	107	67
		118	**107**	**76**
190601	Housing and Human Environments, General			
	Bachelor's degrees	3	0	0
		3	**0**	**0**
230101	English Language and Literature, General			
	Associate degrees	0	0	0
	Bachelor's degrees	844	1,098	975
	Masters degrees	120	144	135
	Doctoral degrees	16	23	20
		981	**1,265**	**1,131**
231001	Speech and Rhetorical Studies			
	Bachelor's degrees	57	17	22
		57	**17**	**22**
239999	English Language and Literature/Letters, Other			
	Bachelor's degrees	0	0	1
		0	**0**	**1**

Career Path: 5.3 Teaching/Training Pathway

240101	Liberal Arts and Sciences/Liberal Studies			
	Awards of less than 1 academic year	0	0	0
	Awards at least 1 but less than 2 academic years	2	1	1
	Associate degrees	2,868	4,969	4,154
	Bachelor's degrees	414	1,293	978
	Masters degrees	32	54	45
		3,317	**6,317**	**5,179**
240102	General Studies			
	Associate degrees	117	153	135
	Bachelor's degrees	162	435	373
	Masters degrees	0	1	2
		280	**589**	**510**
240103	Humanities/Humanistic Studies			
	Associate degrees	0	0	0
	Bachelor's degrees	15	22	18
		15	**22**	**19**
240199	Liberal Arts and Sciences, General Studies and Humanities, Other			
	Associate degrees	9	0	0
	Bachelor's degrees	4	8	6
		12	**8**	**6**
302301	Intercultural/Multicultural and Diversity Studies			
	Bachelor's degrees	2	12	8
	Masters degrees	5	37	25
		7	**49**	**34**
310501	Health and Physical Education, General			
	Associate degrees	1	2	1
	Bachelor's degrees	306	410	386
	Masters degrees	150	145	134
	Doctoral degrees	7	8	7
		463	**565**	**528**
	5.3 TOTAL SUPPLY	**8,938**	**14,800**	**12,506**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
252011	Preschool teachers, except special education Postsecondary vocational training	419
252012	Kindergarten teachers, except special education Bachelor's degree	152
252021	Elementary school teachers, except special education Bachelor's degree	1,360
252022	Middle school teachers, except special and vocational education Bachelor's degree	432
252023	Vocational education teachers, middle school Bachelor's or higher degree, plus work experience	5
252031	Secondary school teachers, except special and vocational education Bachelor's degree	755
252032	Vocational education teachers, secondary school Bachelor's or higher degree, plus work experience	118
252041	Special education teachers, preschool, kindergarten, and elementary school Bachelor's degree	220

Career Path: 5.3 Teaching/Training Pathway

252042	Special education teachers, middle school	69
	Bachelor's degree	
252043	Special education teachers, secondary school	129
	Bachelor's degree	
253011	Adult literacy, remedial education, and GED teachers and instructors	30
	Bachelor's degree	
253099	Teachers and instructors, all other	128
	Bachelor's degree	
254011	Archivists	2
	Master's degree	
254012	Curators	7
	Master's degree	
259041	Teacher assistants	974
	Short-term on-the-job training	
272022	Coaches and scouts	133
	Long-term on-the-job training	

	5.3 TOTAL DEMAND	**4,933**

SUPPLY:	**12,506**
DEMAND:	**4,933**
Demand minus Supply:	**-7,573**
Supply to Demand Ratio:	**2.54**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**12,499**
DEMAND:	**3,407**
Demand minus Supply:	**-9,092**
Supply to Demand Ratio:	**3.67**

Career Path: **6.1 Financial and Investment Planning Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
520801	Finance, General				
	Awards of less than 1 academic year		2	0	0
	Bachelor's degrees		486	699	627
	Masters degrees		15	29	24
			503	**728**	**651**
	6.1 TOTAL SUPPLY		**503**	**728**	**651**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
132052	Personal financial advisors	70
	Bachelor's degree	
132082	Tax preparers	76
	Moderate-term on-the-job training	
413031	Securities, commodities, and financial services sales agents	121
	Bachelor's degree	
434011	Brokerage clerks	19
	Moderate-term on-the-job training	
	6.1 TOTAL DEMAND	**286**

SUPPLY:	**651**
DEMAND:	**286**
Demand minus Supply:	**-365**
Supply to Demand Ratio:	**2.28**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**651**
DEMAND:	**191**
Demand minus Supply:	**-460**
Supply to Demand Ratio:	**3.41**

Career Path: **6.2 Business Financial Management Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
521601	Taxation				
	Masters degrees		2	0	1
			2	**0**	**1**
	6.2 TOTAL SUPPLY		**2**	**0**	**1**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
132051	Financial analysts	79
	Bachelor's degree	
	6.2 TOTAL DEMAND	**79**

SUPPLY:	**1**
DEMAND:	**79**
Demand minus Supply:	**78**
Supply to Demand Ratio:	**0.01**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1**
DEMAND:	**79**
Demand minus Supply:	**78**
Supply to Demand Ratio:	**0.01**

Career Path: 6.3 Banking and Related Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
520803	Banking and Financial Support Services				
	Bachelor's degrees		10	0	0
	Masters degrees		1	12	6
			11	**12**	**6**
	6.3 TOTAL SUPPLY		**11**	**12**	**6**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
132041	Credit analysts	49
	Bachelor's degree	
132072	Loan officers	136
	Moderate-term on-the-job training	
232093	Title examiners, abstractors, and searchers	13
	Moderate-term on-the-job training	
433011	Bill and account collectors	393
	Short-term on-the-job training	
433071	Tellers	506
	Short-term on-the-job training	
434041	Credit authorizers, checkers, and clerks	41
	Short-term on-the-job training	
434131	Loan interviewers and clerks	111
	Short-term on-the-job training	
	6.3 TOTAL DEMAND	**1,249**

SUPPLY:	**6**
DEMAND:	**1,249**
Demand minus Supply:	**1,243**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**6**
DEMAND:	**49**
Demand minus Supply:	**43**
Supply to Demand Ratio:	**0.12**

Career Path: 6.4 Insurance Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
521701	Insurance				
	Bachelor's degrees		2	0	0
			2	**0**	**0**
	6.4 TOTAL SUPPLY		**2**	**0**	**0**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131031	Claims adjusters, examiners, and investigators	140
	Long-term on-the-job training	
131032	Insurance appraisers, auto damage	5
	Postsecondary vocational training	
132053	Insurance underwriters	33
	Bachelor's degree	
152011	Actuaries	8
	Bachelor's or higher degree, plus work experience	
413021	Insurance sales agents	218
	Postsecondary vocational training	
439041	Insurance claims and policy processing clerks	53
	Moderate-term on-the-job training	
439071	Office machine operators, except computer	40
	Short-term on-the-job training	
439081	Proofreaders and copy markers	4
	Short-term on-the-job training	
	6.4 TOTAL DEMAND	**501**

SUPPLY:	**0**
DEMAND:	**501**
Demand minus Supply:	**501**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**0**
DEMAND:	**41**
Demand minus Supply:	**41**
Supply to Demand Ratio:	**0.00**

Career Path: 7.1 Governance Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
440401	Public Administration				
	Bachelor's degrees		10	24	21
	Masters degrees		69	168	130
	Doctoral degrees		3	8	5
			82	**200**	**155**
440501	Public Policy Analysis				
	Bachelor's degrees		7	52	36
	Masters degrees		3	22	17
			11	**74**	**52**
451001	Political Science and Government, General				
	Bachelor's degrees		638	1,236	1,048
	Masters degrees		14	11	15
	Doctoral degrees		7	0	5
			659	**1,247**	**1,067**
	7.1 TOTAL SUPPLY		**751**	**1,521**	**1,275**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
111031	Legislators	94
	Bachelor's or higher degree, plus work experience	
	7.1 TOTAL DEMAND	**94**

SUPPLY:	**1,275**
DEMAND:	**94**
Demand minus Supply:	**-1,181**
Supply to Demand Ratio:	**13.56**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,275**
DEMAND:	**94**
Demand minus Supply:	**-1,181**
Supply to Demand Ratio:	**13.56**

Career Path: 7.2 National Security Pathway

SUPPLY

DEMAND

SUPPLY:	**0**
DEMAND:	**0**
Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **7.3 Foreign Service Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
450901	International Relations and Affairs				
	Bachelor's degrees		57	68	66
			57	**68**	**66**
	7.3 TOTAL SUPPLY		**57**	**68**	**66**

DEMAND

SUPPLY:	**66**
DEMAND:	**0**
Demand minus Supply:	**-66**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**66**
Demand minus Supply:	**-66**
Supply to Demand Ratio:	**-**

Career Path: **7.4 Planning Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
040301	City/Urban, Community and Regional Planning				
	Masters degrees		20	0	2
			20	**0**	**2**
451201	Urban Studies/Affairs				
	Bachelor's degrees		7	1	6
			7	**1**	**6**
	7.4 TOTAL SUPPLY		**26**	**1**	**7**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
193011	Economists	3
	Master's degree	
193051	Urban and regional planners	14
	Master's degree	
434111	Interviewers, except eligibility and loan	164
	Short-term on-the-job training	
439111	Statistical assistants	4
	Moderate-term on-the-job training	
	7.4 TOTAL DEMAND	**185**

SUPPLY:	**7**
DEMAND:	**185**
Demand minus Supply:	**178**
Supply to Demand Ratio:	**0.04**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**7**
DEMAND:	**17**
Demand minus Supply:	**10**
Supply to Demand Ratio:	**0.41**

Career Path: **7.5 Revenue and Taxation Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
132021	Appraisers and assessors of real estate Associate degree	20
132081	Tax examiners, collectors, and revenue agents Bachelor's degree	75
	7.5 TOTAL DEMAND	**95**

SUPPLY:	**0**
DEMAND:	**95**
Demand minus Supply:	**95**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

DEMAND:	**95**
Demand minus Supply:	**95**
Supply to Demand Ratio:	**0.00**

Career Path: **7.6 Regulation Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131041	Compliance officers, except agriculture, construction, health and safety, and transpo Long-term on-the-job training	108
132061	Financial examiners Bachelor's degree	43
333021	Detectives and criminal investigators Work experience in a related occupation	42
435041	Meter readers, utilities Short-term on-the-job training	43
536051	Transportation inspectors Work experience in a related occupation	14
	7.6 TOTAL DEMAND	**250**

SUPPLY:	**0**
DEMAND:	**250**
Demand minus Supply:	**250**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

DEMAND:	**43**
Demand minus Supply:	**43**
Supply to Demand Ratio:	**0.00**

- -

Career Path: **7.7 Public Management and Administration Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
520206	Non-Profit/Public/Organizational Management				
	Associate degrees		0	2	1
	Bachelor's degrees		121	284	200
	Masters degrees		16	2	11
			138	**288**	**212**
	7.7 TOTAL SUPPLY		**138**	**288**	**212**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119131	Postmasters and Mail Superintendents	10
	Work experience in a related occupation	
434031	Court, municipal, and license clerks	73
	Short-term on-the-job training	
434061	Eligibility interviewers, government programs	111
	Moderate-term on-the-job training	
435051	Postal service clerks	30
	Short-term on-the-job training	
435052	Postal service mail carriers	229
	Short-term on-the-job training	
435053	Postal service mail sorters, processors, and processing machine operators	31
	Short-term on-the-job training	
	7.7 TOTAL DEMAND	**484**

SUPPLY:	**212**
DEMAND:	**484**
Demand minus Supply:	**273**
Supply to Demand Ratio:	**0.44**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**212**
Demand minus Supply:	**-212**
Supply to Demand Ratio:	**-**

Career Path: 8.1 Therapeutic Services Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
420101	Psychology, General				
	Associate degrees		1	0	1
	Bachelor's degrees		1,453	1,962	1,827
	Masters degrees		127	93	91
	Post-Masters certificates		0	0	1
	Doctoral degrees		50	46	42
			1,631	**2,101**	**1,962**
420201	Clinical Psychology				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
420301	Cognitive Psychology and Psycholinguistics				
	Bachelor's degrees		7	0	1
			7	**0**	**1**
420901	Industrial and Organizational Psychology				
	Bachelor's degrees		18	24	22
	Doctoral degrees		4	10	6
			21	**34**	**28**
421101	Physiological Psychology/Psychobiology				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
421701	School Psychology				
	Masters degrees		13	60	39
	Post-Masters certificates		1	4	3
			14	**64**	**42**
421801	Educational Psychology				
	Masters degrees		41	43	42
	Post-Masters certificates		0	0	0
	Doctoral degrees		15	0	0
			56	**43**	**42**
429999	Psychology, Other				
	Bachelor's degrees		66	86	72
	Masters degrees		34	25	29
			100	**111**	**101**
510201	Communication Disorders, General				
	Bachelor's degrees		1	4	3
			1	**4**	**3**
510202	Audiology/Audiologist and Hearing Sciences				
	Bachelor's degrees		8	8	7
	Masters degrees		11	2	8
	Doctoral degrees		13	103	64
			32	**113**	**78**

Career Path: 8.1 Therapeutic Services Pathway

510203	Speech-Language Pathology/Pathologist			
	Associate degrees	2	1	0
	Bachelor's degrees	31	12	21
	Masters degrees	29	0	5
		63	**13**	**26**
510204	Audiology/Audiologist & Speech-Language Pathology/Pathologist			
	Bachelor's degrees	13	0	0
	Masters degrees	87	18	37
	Doctoral degrees	7	0	4
		107	**18**	**41**
510299	Communication Disorders Sciences and Services, Other			
	Bachelor's degrees	0	1	1
		0	**1**	**1**
510401	Dentistry (DDS, DMD)			
	First-professional degrees	116	99	95
		116	**99**	**95**
510501	Dental Clinical Sciences, General (MS, PhD)			
	Masters degrees	6	9	8
		6	**9**	**8**
510601	Dental Assisting/Assistant			
	Awards of less than 1 academic year	134	506	369
	Awards at least 1 but less than 2 academic years	51	193	145
	Associate degrees	14	109	71
		198	**808**	**586**
510602	Dental Hygiene/Hygienist			
	Associate degrees	63	32	37
	Awards at least 2 but less than 4 academic years	2	0	0
	Bachelor's degrees	57	128	109
	Masters degrees	1	3	5
		124	**163**	**151**
510801	Medical/Clinical Assistant			
	Awards of less than 1 academic year	524	1,533	1,199
	Awards at least 1 but less than 2 academic years	182	863	588
	Associate degrees	242	1,024	696
		948	**3,420**	**2,483**
510803	Occupational Therapist Assistant			
	Associate degrees	28	63	51
		28	**63**	**51**
510805	Pharmacy Technician/Assistant			
	Awards of less than 1 academic year	62	254	186
	Awards at least 1 but less than 2 academic years	109	410	295
	Associate degrees	24	176	112
		196	**840**	**593**
510806	Physical Therapist Assistant			
	Associate degrees	106	182	141
		106	**182**	**141**

Career Path: **8.1 Therapeutic Services Pathway**

510808	Veterinary/Animal Health Technology/Technician & Veterinary Assistant			
	Associate degrees	27	18	25
		27	**18**	**25**
510908	Respiratory Care Therapy/Therapist			
	Awards of less than 1 academic year	8	30	22
	Awards at least 1 but less than 2 academic years	6	0	0
	Associate degrees	107	301	235
	Bachelor's degrees	16	40	27
		137	**371**	**284**
510909	Surgical Technology/Technologist			
	Awards at least 1 but less than 2 academic years	70	275	193
	Associate degrees	104	443	322
		174	**718**	**515**
510999	Allied Health Diagnostic, Intervention, & Treatment Professions, Other			
	Awards of less than 1 academic year	16	0	5
	Bachelor's degrees	9	0	0
		25	**0**	**5**
511001	Blood Bank Technology Specialist			
	Awards of less than 1 academic year	22	24	29
		22	**24**	**29**
511201	Medicine (MD)			
	First-professional degrees	381	320	331
		381	**320**	**331**
511601	Nursing - Registered Nurse Training (RN, ASN, BSN, MSN)			
	Associate degrees	997	2,254	1,785
	Bachelor's degrees	1,152	3,109	2,314
	Masters degrees	102	617	431
	Post-Masters certificates	0	3	2
		2,251	**5,983**	**4,532**
511602	Nursing Administration (MSN, MS, PhD)			
	Bachelor's degrees	28	0	1
	Masters degrees	9	21	23
		37	**21**	**24**
511603	Adult Health Nurse/Nursing			
	Postbaccalaureate certificates	0	1	1
	Masters degrees	42	104	82
		42	**105**	**83**
511604	Nurse Anesthetist			
	Postbaccalaureate certificates	0	0	1
	Masters degrees	46	111	88
		47	**111**	**89**
511605	Family Practice Nurse/Nurse Practitioner			
	Postbaccalaureate certificates	1	3	3
	Masters degrees	44	228	149
		44	**231**	**152**

Career Path: 8.1 Therapeutic Services Pathway

511606	Maternal/Child Health and Neonatal Nurse/Nursing			
	Masters degrees	9	57	39
		9	**57**	**39**
511607	Nurse Midwife/Nursing Midwifery			
	Masters degrees	12	13	11
		12	**13**	**11**
511608	Nursing Science (MS, PhD)			
	Bachelor's degrees	12	0	0
	Masters degrees	85	0	1
	Post-Masters certificates	2	0	0
	Doctoral degrees	25	72	67
		123	**72**	**68**
511609	Pediatric Nurse/Nursing			
	Masters degrees	23	71	54
		23	**71**	**54**
511610	Psychiatric/Mental Health Nurse/Nursing			
	Postbaccalaureate certificates	0	0	1
	Masters degrees	21	43	36
		21	**43**	**36**
511611	Public Health/Community Nurse/Nursing			
	Masters degrees	34	0	0
		34	**0**	**0**
511613	Licensed Practical /Vocational Nurse Training (LPN, LVN, Cert, Dipl, AAS)			
	Awards at least 1 but less than 2 academic years	5	0	0
		5	**0**	**0**
511616	Clinical Nurse Specialist			
	Masters degrees	2	15	10
	Post-Masters certificates	0	2	1
		2	**17**	**11**
511617	Critical Care Nursing			
	Masters degrees	18	141	92
		18	**141**	**92**
511699	Nursing, Other			
	Associate degrees	2	0	0
	Bachelor's degrees	31	149	105
	Postbaccalaureate certificates	0	4	3
	Masters degrees	43	0	2
	Post-Masters certificates	0	2	2
		76	**155**	**112**
511701	Optometry (OD)			
	First-professional degrees	115	110	113
		115	**110**	**113**
511801	Opticianry/Ophthalmic Dispensing Optician			
	Associate degrees	15	3	8
		15	**3**	**8**

Career Path: **8.1 Therapeutic Services Pathway**

511803	Opthalmic Technician/Technologist			
	Associate degrees	5	26	18
		5	**26**	**18**
512001	Pharmacy (PharmD [USA] PharmD, BS/BPharm [Canada])			
	First-professional degrees	101	151	126
		101	**151**	**126**
512301	Art Therapy/Therapist			
	Bachelor's degrees	1	3	2
		1	**3**	**2**
512305	Music Therapy/Therapist			
	Bachelor's degrees	0	0	0
		0	**0**	**0**
512401	Veterinary Medicine (DVM)			
	First-professional degrees	64	69	70
		64	**69**	**70**
512501	Veterinary Sciences/Veterinary Clinical Sciences, General (Cert, MS, PhD)			
	Bachelor's degrees	1	3	3
		1	**3**	**3**
512602	Home Health Aide/Home Attendant			
	Awards of less than 1 academic year	100	251	220
		100	**251**	**220**
513101	Dietetics/Dietitian (RD)			
	Bachelor's degrees	7	21	11
	Masters degrees	5	0	0
		12	**21**	**11**
513102	Clinical Nutrition/Nutritionist			
	Masters degrees	7	46	30
		7	**46**	**30**
513104	Dietitian Assistant			
	Associate degrees	6	3	5
		6	**3**	**5**
513199	Dietetics and Clinical Nutrition Services, Other			
	Bachelor's degrees	1	0	2
	Masters degrees	1	0	2
		3	**0**	**3**
513501	Massage Therapy/Therapeutic Massage			
	Awards of less than 1 academic year	56	120	110
	Awards at least 1 but less than 2 academic years	105	57	107
	Associate degrees	99	474	341
		259	**651**	**557**

Career Path: 8.1 Therapeutic Services Pathway

519999	Health Professions and Related Clinical Sciences, Other			
	Awards of less than 1 academic year	8	0	25
	Awards at least 1 but less than 2 academic years	0	0	0
	Associate degrees	57	13	15
	Bachelor's degrees	68	219	169
	Masters degrees	2	1	1
	Doctoral degrees	4	0	1
		140	**233**	**211**
	8.1 TOTAL SUPPLY	**8,095**	**18,129**	**14,304**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
291011	Chiropractors First professional degree	7
291021	Dentists, general First professional degree	54
291022	Oral and maxillofacial surgeons First professional degree	4
291023	Orthodontists First professional degree	3
291024	Prosthodontists First professional degree	0
291031	Dietitians and nutritionists Bachelor's degree	53
291041	Optometrists First professional degree	15
291051	Pharmacists First professional degree	188
291071	Physician assistants Master's degree	76
291081	Podiatrists First professional degree	4
291111	Registered nurses Associate degree	2,070
291121	Audiologists First professional degree	18
291122	Occupational therapists Master's degree	51
291123	Physical therapists Master's degree	149
291124	Radiation therapists Associate degree	52
291125	Recreational therapists Bachelor's degree	13
291126	Respiratory therapists Associate degree	61
291127	Speech-language pathologists Master's degree	58
291199	Health diagnosing and treating practitioners, all other Bachelor's degree	11
292021	Dental hygienists Associate degree	157
292051	Dietetic technicians Postsecondary vocational training	17

Career Path: **8.1 Therapeutic Services Pathway**

292052	Pharmacy technicians Moderate-term on-the-job training	387
292053	Psychiatric technicians Postsecondary vocational training	26
292054	Respiratory therapy technicians Postsecondary vocational training	13
292055	Surgical technologists Postsecondary vocational training	160
292061	Licensed practical and licensed vocational nurses Postsecondary vocational training	1,284
292081	Opticians, dispensing Long-term on-the-job training	17
292091	Orthotists and prosthetists Bachelor's degree	2
299091	Athletic trainers Bachelor's degree	17
311011	Home health aides Short-term on-the-job training	931
311012	Nursing aides, orderlies, and attendants Postsecondary vocational training	810
311013	Psychiatric aides Short-term on-the-job training	44
312011	Occupational therapist assistants Associate degree	21
312012	Occupational therapist aides Short-term on-the-job training	7
312021	Physical therapist assistants Associate degree	59
312022	Physical therapist aides Short-term on-the-job training	32
319091	Dental assistants Moderate-term on-the-job training	238
319092	Medical assistants Moderate-term on-the-job training	385
319095	Pharmacy aides Short-term on-the-job training	20
519081	Dental laboratory technicians Moderate-term on-the-job training	29
519083	Ophthalmic laboratory technicians Moderate-term on-the-job training	19

8.1 TOTAL DEMAND		**7,562**

SUPPLY:	**14,304**
DEMAND:	**7,562**
Demand minus Supply:	**-6,742**
Supply to Demand Ratio:	**1.89**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**10,809**
DEMAND:	**3,143**
Demand minus Supply:	**-7,666**
Supply to Demand Ratio:	**3.44**

Career Path: 8.2 Diagnostic Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
410101	Biology Technician/Biotechnology Laboratory Technician				
	Bachelor's degrees	Yes	0	0	0
			0	**0**	**0**
510802	Clinical/Medical Laboratory Assistant				
	Awards of less than 1 academic year		1	0	1
			1	**0**	**1**
510812	Respiratory Therapy Technician/Assistant				
	Awards of less than 1 academic year		3	11	17
			3	**11**	**17**
510899	Allied Health and Medical Assisting Services, Other				
	Associate degrees		22	143	100
			22	**143**	**100**
510901	Cardiovascular Technology/Technologist				
	Awards at least 1 but less than 2 academic years		1	4	7
	Associate degrees		13	45	33
			14	**49**	**39**
510904	Emergency Medical Technology/Technician (EMT Paramedic)				
	Awards of less than 1 academic year		262	652	569
	Awards at least 1 but less than 2 academic years		110	101	90
	Associate degrees		4	12	9
			376	**765**	**668**
510905	Nuclear Medical Technology/Technologist				
	Awards at least 1 but less than 2 academic years		19	65	53
	Bachelor's degrees		12	0	4
			31	**65**	**57**
510907	Medical Radiologic Technology/Science - Radiation Therapist				
	Awards of less than 1 academic year		23	97	96
	Awards at least 1 but less than 2 academic years		17	18	20
	Associate degrees		170	355	292
	Awards at least 2 but less than 4 academic years		8	57	45
	Bachelor's degrees		4	33	19
			222	**560**	**472**
510910	Diagnostic Medical Sonography/Sonographer & Ultrasound Technician				
	Awards of less than 1 academic year		12	21	22
	Awards at least 1 but less than 2 academic years		11	11	6
	Bachelor's degrees		11	0	3
			33	**32**	**31**
510911	Radiologic Technology/Science - Radiographer				
	Awards of less than 1 academic year		6	29	21
	Associate degrees		79	210	201
	Bachelor's degrees		9	67	46
			94	**306**	**269**

Career Path: 8.2 Diagnostic Services Pathway

510912	Physician Assistant			
	Associate degrees	0	0	0
	Bachelor's degrees	0	0	0
	Masters degrees	44	109	86
		45	**109**	**86**
510913	Athletic Training/Trainer			
	Associate degrees	0	0	1
	Bachelor's degrees	29	51	39
	Masters degrees	17	26	19
		46	**77**	**59**
511002	Cytotechnology/Cytotechnologist			
	Bachelor's degrees	5	0	0
	Masters degrees	1	2	4
		5	**2**	**4**
511004	Clinical/Medical Laboratory Technician			
	Associate degrees	49	117	87
	Bachelor's degrees	3	0	0
		52	**117**	**87**
511005	Clinical Laboratory Science/Medical Technology/Technologist			
	Awards at least 2 but less than 4 academic years	1	0	0
	Bachelor's degrees	35	57	45
		36	**57**	**45**
511009	Phlebotomy/Phlebotomist			
	Awards at least 1 but less than 2 academic years	1	6	4
	Associate degrees	0	1	1
		1	**7**	**5**
511099	Clinical/Medical Laboratory Science & Allied Professions, Other			
	Awards of less than 1 academic year	21	72	50
		21	**72**	**50**
	8.2 TOTAL SUPPLY	**1,003**	**2,372**	**1,989**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
292011	Medical and clinical laboratory technologists Bachelor's degree	65
292012	Medical and clinical laboratory technicians Associate degree	196
292031	Cardiovascular technologists and technicians Associate degree	19
292032	Diagnostic medical sonographers Associate degree	32
292033	Nuclear medicine technologists Associate degree	14
292034	Radiologic technologists and technicians Associate degree	116
319099	Healthcare support workers, all other Short-term on-the-job training	58
	8.2 TOTAL DEMAND	**500**

Career Path: **8.2 Diagnostic Services Pathway**

SUPPLY:	**1,989**
DEMAND:	**500**
Demand minus Supply:	**-1,489**
Supply to Demand Ratio:	**3.98**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,032**
DEMAND:	**442**
Demand minus Supply:	**-590**
Supply to Demand Ratio:	**2.34**

Career Path: 8.3 Health Informatics Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
510701	Health/Health Care Administration/Management				
	Bachelor's degrees		25	0	7
	Postbaccalaureate certificates		10	20	14
	Masters degrees		22	108	76
	Post-Masters certificates		0	1	1
	Doctoral degrees		1	4	3
			59	**133**	**100**
510702	Hospital & Health Care Facilities Administration/Management				
	Bachelor's degrees		8	40	27
	Masters degrees		12	13	14
			21	**53**	**41**
510705	Medical Office Management/Administration				
	Awards of less than 1 academic year		140	157	153
	Awards at least 1 but less than 2 academic years		0	0	1
	Associate degrees		6	35	19
			145	**192**	**173**
510706	Health Information/Medical Records Administration/Administrator				
	Awards of less than 1 academic year		0	0	1
	Awards at least 1 but less than 2 academic years		5	12	11
	Associate degrees		15	56	36
	Bachelor's degrees		21	50	30
			41	**118**	**77**
510707	Health Information/Medical Records Technology/Technician				
	Awards of less than 1 academic year		29	29	38
	Awards at least 1 but less than 2 academic years		58	278	220
	Associate degrees		63	184	135
			151	**491**	**392**
510708	Medical Transcription/Transcriptionist				
	Awards of less than 1 academic year		28	33	28
	Awards at least 1 but less than 2 academic years		11	0	3
			40	**33**	**31**
510710	Medical Office Assistant/Specialist				
	Awards of less than 1 academic year		10	67	42
	Awards at least 1 but less than 2 academic years		32	198	136
			42	**265**	**178**
510712	Medical Reception/Receptionist				
	Awards of less than 1 academic year		1	0	1
			1	**0**	**1**
510713	Medical Insurance Coding Specialist/Coder				
	Awards of less than 1 academic year		28	229	164
	Awards at least 1 but less than 2 academic years		8	84	49
	Associate degrees		1	4	7
			37	**317**	**219**

Career Path: 8.3 Health Informatics Pathway

510714	Medical Insurance Specialist/Medical Biller			
	Awards of less than 1 academic year	11	109	67
	Awards at least 1 but less than 2 academic years	27	158	93
	Associate degrees	35	354	214
		73	**621**	**375**
510716	Medical Administrative/Executive Assistant & Medical Secretary			
	Awards of less than 1 academic year	12	0	0
	Awards at least 1 but less than 2 academic years	14	85	63
	Associate degrees	20	0	0
		46	**85**	**63**
510799	Health and Medical Administrative Services, Other			
	Awards of less than 1 academic year	2	0	2
	Awards at least 1 but less than 2 academic years	3	9	14
	Awards at least 2 but less than 4 academic years	4	0	0
	Masters degrees	0	0	0
		10	**9**	**16**
511503	Clinical/Medical Social Work			
	Bachelor's degrees	1	0	0
		1	**0**	**0**
512201	Public Health, General (MPH, DPH)			
	Bachelor's degrees	31	12	17
	Masters degrees	62	106	90
		93	**118**	**106**
512202	Environmental Health			
	Associate degrees	4	11	9
	Bachelor's degrees	14	0	0
	Masters degrees	5	0	0
		23	**11**	**9**
512205	Health/Medical Physics			
	Masters degrees	3	23	16
		3	**23**	**16**
512207	Public Health Education and Promotion			
	Bachelor's degrees	0	0	0
		0	**0**	**0**
512299	Public Health, Other			
	Postbaccalaureate certificates	0	1	2
	Masters degrees	4	22	17
		4	**23**	**19**
512306	Occupational Therapy/Therapist			
	Associate degrees	1	0	2
	Bachelor's degrees	34	0	1
	Masters degrees	40	136	93
	Post-Masters certificates	3	0	1
	Doctoral degrees	14	40	33
		91	**176**	**130**

Career Path: 8.3 Health Informatics Pathway

512308	Physical Therapy/Therapist			
	Associate degrees	4	22	16
	Bachelor's degrees	38	0	0
	Masters degrees	48	0	9
	Doctoral degrees	66	276	198
		156	**298**	**224**
512310	Vocational Rehabilitation Counseling/Counselor			
	Masters degrees	0	0	0
		0	**0**	**0**
512399	Rehabilitation and Therapeutic Professions, Other			
	Bachelor's degrees	1	0	0
		1	**0**	**0**
	8.3 TOTAL SUPPLY	**1,038**	**2,966**	**2,168**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
191041	Epidemiologists	3
	Master's degree	
211091	Health educators	59
	Bachelor's degree	
292071	Medical records and health information technicians	105
	Associate degree	
319094	Medical transcriptionists	32
	Postsecondary vocational training	
	8.3 TOTAL DEMAND	**199**

SUPPLY:	**2,168**
DEMAND:	**199**
Demand minus Supply:	**-1,969**
Supply to Demand Ratio:	**10.89**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,084**
DEMAND:	**167**
Demand minus Supply:	**-917**
Supply to Demand Ratio:	**6.49**

Career Path: 8.4 Support Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
190501	Foods, Nutrition, and Wellness Studies, General				
	Associate degrees		1	1	1
	Bachelor's degrees		34	77	60
	Masters degrees		10	17	13
			45	**95**	**74**
190505	Foodservice Systems Administration/Management				
	Awards of less than 1 academic year		3	27	17
	Bachelor's degrees		1	4	2
			4	**31**	**19**
190599	Foods, Nutrition, and Related Services, Other				
	Bachelor's degrees		0	0	0
			0	**0**	**0**
	8.4 TOTAL SUPPLY		**49**	**126**	**93**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
211023	Mental health and substance abuse social workers Master's degree	117
	8.4 TOTAL DEMAND	**117**

SUPPLY:	**93**
DEMAND:	**117**
Demand minus Supply:	**24**
Supply to Demand Ratio:	**0.80**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**76**
DEMAND:	**117**
Demand minus Supply:	**41**
Supply to Demand Ratio:	**0.65**

Career Path: 8.5 Biotechnology Research and Development

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
261201	Biotechnology				
	Associate degrees	Yes	1	7	5
			1	**7**	**5**
512004	Medicinal and Pharmaceutical Chemistry (MS, PhD)				
	Masters degrees		1	2	2
	Doctoral degrees		6	27	16
			7	**29**	**18**
512099	Pharmacy, Pharmaceutical Sciences, and Administration, Other				
	Awards at least 1 but less than 2 academic years		0	2	1
			0	**2**	**1**
	8.5 TOTAL SUPPLY		**8**	**38**	**23**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
172031	Biomedical engineers	21
	Bachelor's degree	
191042	Medical scientists, except epidemiologists	49
	Doctoral degree	
319093	Medical equipment preparers	9
	Short-term on-the-job training	
	8.5 TOTAL DEMAND	**79**

SUPPLY:	**23**
DEMAND:	**79**
Demand minus Supply:	**56**
Supply to Demand Ratio:	**0.29**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**23**
DEMAND:	**70**
Demand minus Supply:	**48**
Supply to Demand Ratio:	**0.32**

Career Path: 9.1 Restaurants and Food/Beverage Services Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
120503	Culinary Arts/Chef Training				
	Awards of less than 1 academic year		10	12	12
	Associate degrees		8	39	25
			18	**51**	**37**
520905	Restaurant/Food Services Management				
	Associate degrees		6	63	32
			6	**63**	**32**
	9.1 TOTAL SUPPLY		**24**	**114**	**69**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119051	Food service managers Work experience in a related occupation	304
351011	Chefs and head cooks Work experience in a related occupation	18
351012	First-line supervisors/managers of food preparation and serving workers Work experience in a related occupation	286
352011	Cooks, fast food Short-term on-the-job training	346
352012	Cooks, institution and cafeteria Moderate-term on-the-job training	464
352013	Cooks, private household Long-term on-the-job training	3
352014	Cooks, restaurant Long-term on-the-job training	699
352015	Cooks, short order Short-term on-the-job training	93
352021	Food preparation workers Short-term on-the-job training	666
353011	Bartenders Short-term on-the-job training	246
353021	Combined food preparation and serving workers, including fast food Short-term on-the-job training	2,091
353022	Counter attendants, cafeteria, food concession, and coffee shop Short-term on-the-job training	402
353031	Waiters and waitresses Short-term on-the-job training	3,300
353041	Food servers, nonrestaurant Short-term on-the-job training	42
359011	Dining room and cafeteria attendants and bartender helpers Short-term on-the-job training	339
359021	Dishwashers Short-term on-the-job training	509
359031	Hosts and hostesses, restaurant, lounge, and coffee shop Short-term on-the-job training	656
359099	Food preparation and serving related workers, all other Short-term on-the-job training	67
513011	Bakers Long-term on-the-job training	50
519012	Separating, filtering, clarifying, precipitating, and still machine setters, operators, an Moderate-term on-the-job training	16
	9.1 TOTAL DEMAND	**10,597**

Career Path: **9.1 Restaurants and Food/Beverage Services Pathway**

SUPPLY:	**69**
DEMAND:	**10,597**
Demand minus Supply:	**10,528**
Supply to Demand Ratio:	**0.01**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**56**
Demand minus Supply:	**-56**
Supply to Demand Ratio:	**-**

Career Path: 9.2 Lodging Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
520904	Hotel/Motel Administration/Management				
	Associate degrees		12	3	10
	Bachelor's degrees		38	36	44
			50	**39**	**54**
	9.2 TOTAL SUPPLY		**50**	**39**	**54**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119081	Lodging managers	54
	Work experience in a related occupation	
371011	First-line supervisors/managers of housekeeping and janitorial workers	57
	Work experience in a related occupation	
372011	Janitors and cleaners, except maids and housekeeping cleaners	805
	Short-term on-the-job training	
372012	Maids and housekeeping cleaners	603
	Short-term on-the-job training	
393031	Ushers, lobby attendants, and ticket takers	213
	Short-term on-the-job training	
396011	Baggage porters and bellhops	30
	Short-term on-the-job training	
396012	Concierges	14
	Moderate-term on-the-job training	
432011	Switchboard operators, including answering service	76
	Short-term on-the-job training	
434081	Hotel, motel, and resort desk clerks	303
	Short-term on-the-job training	
	9.2 TOTAL DEMAND	**2,155**

SUPPLY:	**54**
DEMAND:	**2,155**
Demand minus Supply:	**2,101**
Supply to Demand Ratio:	**0.03**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**54**
Demand minus Supply:	**-54**
Supply to Demand Ratio:	**-**

Career Path: **9.3 Travel and Tourism Pathway**

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
520901	Hospitality Administration/Management, General				
	Associate degrees		1	0	0
	Bachelor's degrees		3	0	0
			4	**0**	**0**
521905	Tourism and Travel Services Marketing Operations				
	Associate degrees		2	0	0
			2	**0**	**0**
	9.3 TOTAL SUPPLY		**6**	**0**	**0**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131121	Meeting and convention planners Bachelor's degree	18
273091	Interpreters and translators Long-term on-the-job training	23
396021	Tour guides and escorts Moderate-term on-the-job training	47
396022	Travel guides Moderate-term on-the-job training	2
396032	Transportation attendants, except flight attendants and baggage porters Short-term on-the-job training	9
413041	Travel agents Postsecondary vocational training	7
434181	Reservation and transportation ticket agents and travel clerks Short-term on-the-job training	47
	9.3 TOTAL DEMAND	**153**

SUPPLY:	**0**
DEMAND:	**153**
Demand minus Supply:	**153**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**0**
DEMAND:	**18**
Demand minus Supply:	**18**
Supply to Demand Ratio:	**0.01**

Career Path: **9.4 Recreation, Amusements and Attractions Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
253021	Self-enrichment education teachers Work experience in a related occupation	139
254013	Museum Technicians and Conservators Bachelor's degree	4
271027	Set and exhibit designers Bachelor's degree	2
272021	Athletes and sports competitors Long-term on-the-job training	19
272023	Umpires, referees, and other sports officials Long-term on-the-job training	1
391011	Gaming supervisors Work experience in a related occupation	3
391012	Slot key persons Postsecondary vocational training	0
392011	Animal trainers Moderate-term on-the-job training	22
393021	Motion picture projectionists Short-term on-the-job training	15
393091	Amusement and recreation attendants Short-term on-the-job training	222
399032	Recreation workers Short-term on-the-job training	151
433041	Gaming cage workers Short-term on-the-job training	0
	9.4 TOTAL DEMAND	**578**

SUPPLY:	**0**
DEMAND:	**578**
Demand minus Supply:	**578**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

DEMAND:	**6**
Demand minus Supply:	**6**
Supply to Demand Ratio:	**0.00**

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Career Path: 10.1 Early Childhood Development and Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
190706	Child Development				
	Awards of less than 1 academic year		70	82	78
	Awards at least 1 but less than 2 academic years		8	53	39
	Associate degrees		81	111	140
	Bachelor's degrees		67	68	68
	Masters degrees		4	29	17
			229	**343**	**342**
190708	Child Care and Support Services Management				
	Awards of less than 1 academic year		3	0	0
			3	**0**	**0**
190709	Child Care Provider/Assistant				
	Associate degrees		0	0	0
			0	**0**	**0**
	10.1 TOTAL SUPPLY		**232**	**343**	**342**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
399011	Child care workers	918
	Short-term on-the-job training	
	10.1 TOTAL DEMAND	**918**

SUPPLY:	**342**
DEMAND:	**918**
Demand minus Supply:	**576**
Supply to Demand Ratio:	**0.37**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**226**
Demand minus Supply:	**-226**
Supply to Demand Ratio:	**-**

Career Path: 10.2 Counseling and Mental Health Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
380101	Philosophy				
	Bachelor's degrees		109	174	160
	Masters degrees		17	25	21
	Doctoral degrees		11	13	11
			137	**212**	**191**
380103	Ethics				
	Bachelor's degrees		4	16	12
			4	**16**	**12**
380201	Religion/Religious Studies				
	Bachelor's degrees		127	141	143
	Masters degrees		27	40	37
	Doctoral degrees		14	10	11
			168	**191**	**190**
380203	Christian Studies				
	Awards of less than 1 academic year		2	17	9
	Associate degrees		2	10	7
	Bachelor's degrees		11	62	42
			14	**89**	**58**
380206	Jewish/Judaic Studies				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
380299	Religion/Religious Studies, Other				
	Bachelor's degrees		3	20	12
			3	**20**	**12**
389999	Philosophy and Religion, Other				
	Associate degrees		1	0	0
	Bachelor's degrees		18	16	20
			20	**16**	**20**
390201	Bible/Biblical Studies				
	Awards at least 1 but less than 2 academic years		3	0	1
	Associate degrees		22	23	25
	Awards at least 2 but less than 4 academic years		0	1	0
	Bachelor's degrees		209	212	194
	Masters degrees		28	22	26
			263	**258**	**246**
390301	Missions/Missionary Studies and Missiology				
	Associate degrees		0	1	1
	Bachelor's degrees		16	0	5
	Masters degrees		0	3	2
			17	**4**	**7**

Career Path: 10.2 Counseling and Mental Health Services Pathway

390401	Religious Education			
	Bachelor's degrees	43	0	11
	Masters degrees	9	25	34
		52	**25**	**44**
390501	Religious/Sacred Music			
	Bachelor's degrees	6	25	15
	Masters degrees	2	7	5
		7	**32**	**20**
390601	Theology/Theological Studies			
	Awards at least 1 but less than 2 academic years	0	3	2
	Associate degrees	1	6	4
	Awards at least 2 but less than 4 academic years	0	0	0
	Bachelor's degrees	47	93	78
	Postbaccalaureate certificates	2	0	0
	Masters degrees	99	188	139
	Doctoral degrees	13	0	1
		162	**290**	**223**
390602	Divinity/Ministry BD, Mdiv.			
	Masters degrees	2	8	13
	First-professional degrees	175	130	136
	First-professional certificates	2	5	2
		179	**143**	**152**
390604	Pre-Theology/Pre-Ministerial Studies			
	Awards of less than 1 academic year	1	0	0
	Associate degrees	1	0	0
	Awards at least 2 but less than 4 academic years	1	5	6
	Bachelor's degrees	8	58	34
		11	**63**	**40**
390699	Theological and ministerial Studies, Other			
	Associate degrees	0	0	0
	Bachelor's degrees	14	0	0
	Masters degrees	8	41	23
	Doctoral degrees	7	8	8
		30	**49**	**31**
390701	Pastoral Studies/Counseling			
	Associate degrees	0	1	1
	Bachelor's degrees	14	100	69
	Masters degrees	1	6	3
		15	**107**	**73**
390702	Youth Ministry New			
	Bachelor's degrees	22	124	88
	Masters degrees	2	10	10
		25	**134**	**97**
390799	Pastoral Counseling and Specialized Ministries, Other			
	Bachelor's degrees	2	17	10
		2	**17**	**10**

Career Path: **10.2 Counseling and Mental Health Services Pathway**

399999	Theological Studies and Religious Vocations, Other			
	Bachelor's degrees	25	0	4
	Masters degrees	1	0	0
	Doctoral degrees	4	16	10
		30	**16**	**13**
420401	Community Psychology			
	Masters degrees	4	13	9
	Doctoral degrees	0	6	3
		5	**19**	**12**
420601	Counseling Psychology			
	Bachelor's degrees	1	10	6
	Masters degrees	91	223	189
	Doctoral degrees	8	5	6
		100	**238**	**200**
420701	Developmental and Child Psychology			
	Bachelor's degrees	41	34	47
		41	**34**	**47**
511501	Substance Abuse/Addiction Counseling			
	Awards of less than 1 academic year	20	43	31
		20	**43**	**31**
511505	Marriage and Family Therapy/Counseling			
	Masters degrees	20	91	64
		20	**91**	**64**
511508	Mental Health Counseling/Counselor			
	Masters degrees	2	6	10
		2	**6**	**10**
	10.2 TOTAL SUPPLY	**1,326**	**2,114**	**1,805**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
193032	Industrial-organizational psychologists Master's degree	1
193041	Sociologists Master's degree	0
211011	Substance abuse and behavioral disorder counselors Bachelor's degree	72
211013	Marriage and family therapists Master's degree	29
211014	Mental health counselors Master's degree	109
211015	Rehabilitation counselors Master's degree	481
211019	Counselors, all other Master's degree	31
	10.2 TOTAL DEMAND	**723**

SUPPLY:	**1,805**
DEMAND:	**723**
Demand minus Supply:	**-1,082**
Supply to Demand Ratio:	**2.50**

Career Path: **10.2 Counseling and Mental Health Services Pathway**

Supply (Assoc or higher) / Demand (requires Assoc or higher)	
SUPPLY :	**1,762**
DEMAND:	**723**
Demand minus Supply:	**-1,039**
Supply to Demand Ratio:	**2.44**

Career Path: **10.3 Family and Community Services Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
190000	Work and Family Studies				
	Bachelor's degrees		4	20	13
			4	**20**	**13**
190701	Human Development and Family Studies, General				
	Bachelor's degrees		80	101	106
	Masters degrees		29	32	31
			109	**133**	**136**
190704	Family Systems				
	Bachelor's degrees		43	0	1
			43	**0**	**1**
190799	Human Development, Family Studies, & Related Services, Other				
	Awards of less than 1 academic year		14	107	64
			14	**107**	**64**
440000	Human Services, General				
	Associate degrees		0	4	2
	Bachelor's degrees		24	105	81
			25	**109**	**83**
440201	Community Organization and Advocacy				
	Associate degrees		29	17	21
	Bachelor's degrees		28	0	1
	Masters degrees		3	19	13
			61	**36**	**34**
440701	Social Work				
	Bachelor's degrees		323	250	301
	Masters degrees		206	257	246
	Doctoral degrees		4	5	6
			533	**512**	**552**
449999	Public Administration and Social Service Professions, Other				
	Associate degrees		3	11	10
	Bachelor's degrees		2	10	9
	Masters degrees		20	0	3
			24	**21**	**22**
450101	Social Sciences, General				
	Associate degrees		0	0	0
	Bachelor's degrees		228	137	198
	Masters degrees		0	0	0
			228	**137**	**198**
451101	Sociology				
	Associate degrees		0	0	0
	Bachelor's degrees		389	565	493
	Masters degrees		23	24	26
	Doctoral degrees		8	5	6
			420	**594**	**525**

Career Path: 10.3 Family and Community Services Pathway

459999	Social Sciences, Other			
	Bachelor's degrees	39	0	11
		39	**0**	**11**
	10.3 TOTAL SUPPLY	**1,499**	**1,669**	**1,639**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119151	Social and community services managers Bachelor's degree	119
211021	Child, family, and school social workers Bachelor's degree	230
211022	Medical and public health social workers Bachelor's degree	127
211093	Social and human service assistants Moderate-term on-the-job training	117
212011	Clergy Master's degree	587
212021	Directors, religious activities and education Bachelor's degree	296
399041	Residential advisors Short-term on-the-job training	188
	10.3 TOTAL DEMAND	**1,664**

SUPPLY:	**1,639**
DEMAND:	**1,664**
Demand minus Supply:	**25**
Supply to Demand Ratio:	**0.99**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,575**
DEMAND:	**1,359**
Demand minus Supply:	**-216**
Supply to Demand Ratio:	**1.16**

Career Path: 10.4 Personal Care Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
120301	Funeral Service and Mortuary Science, General				
	Awards at least 1 but less than 2 academic years		2	4	7
	Associate degrees		31	17	23
			33	**21**	**30**
120401	Cosmetology/Cosmetologist, General				
	Awards at least 1 but less than 2 academic years		27	10	25
	Associate degrees		0	2	2
			28	**12**	**27**
120406	Make-Up Artist/Specialist				
	Awards of less than 1 academic year		16	35	31
			16	**35**	**31**
120409	Aesthetician/Esthetician and Skin Care Specialist				
	Awards of less than 1 academic year		5	51	32
			5	**51**	**32**
120410	Nail Technician/Specialist and Manicurist				
	Awards of less than 1 academic year		7	49	34
			7	**49**	**34**
120499	Cosmetology and Related Personal Grooming Arts, Other				
	Awards of less than 1 academic year		8	80	51
	Awards at least 1 but less than 2 academic years		10	55	55
			18	**135**	**107**
	10.4 TOTAL SUPPLY		**107**	**303**	**260**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119061	Funeral directors	33
	Associate degree	
319011	Massage therapists	32
	Postsecondary vocational training	
391021	First-line supervisors/managers of personal service workers	126
	Work experience in a related occupation	
393092	Costume attendants	1
	Short-term on-the-job training	
393093	Locker room, coatroom, and dressing room attendants	11
	Short-term on-the-job training	
394011	Embalmers	6
	Postsecondary vocational training	
394021	Funeral attendants	71
	Short-term on-the-job training	
395011	Barbers	2
	Postsecondary vocational training	
395012	Hairdressers, hairstylists, and cosmetologists	182
	Postsecondary vocational training	
395092	Manicurists and pedicurists	14
	Postsecondary vocational training	
395093	Shampooers	3
	Short-term on-the-job training	

Career Path: 10.4 Personal Care Services Pathway

395094	Skin care specialists Postsecondary vocational training	14
399021	Personal and home care aides Short-term on-the-job training	643
399031	Fitness trainers and aerobics instructors Postsecondary vocational training	162
516011	Laundry and dry-cleaning workers Moderate-term on-the-job training	73
516021	Pressers, textile, garment, and related materials Short-term on-the-job training	9
516052	Tailors, dressmakers, and custom sewers Long-term on-the-job training	10

10.4 TOTAL DEMAND	**1,392**

SUPPLY:	**260**
DEMAND:	**1,392**
Demand minus Supply:	**1,132**
Supply to Demand Ratio:	**0.19**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**25**
DEMAND:	**33**
Demand minus Supply:	**8**
Supply to Demand Ratio:	**0.75**

Career Path: **10.5 Consumer Services Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
190101	Family and Consumer Sciences/Human Sciences, General				
	Bachelor's degrees		220	402	355
	Masters degrees		11	2	7
	Doctoral degrees		16	0	3
			246	**404**	**366**
190203	Consumer Merchandising/Retailing Management				
	Bachelor's degrees		1	3	3
			1	**3**	**3**
190401	Family Resource Management Studies, General				
	Bachelor's degrees		58	109	96
			58	**109**	**96**
190402	Consumer Economics				
	Bachelor's degrees		79	0	23
	Masters degrees		8	0	2
			87	**0**	**25**
190403	Consumer Services and Advocacy				
	Bachelor's degrees		2	20	12
			2	**20**	**12**
190499	Family and Consumer Economics and Related Services, Other				
	Bachelor's degrees		0	0	0
			0	**0**	**0**
	10.5 TOTAL SUPPLY		**395**	**536**	**500**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119141	Property, real estate amd community association managers	143
	Bachelor's degree	
132071	Loan counselors	8
	Bachelor's degree	
	10.5 TOTAL DEMAND	**151**

	SUPPLY:	**500**
	DEMAND:	**151**
	Demand minus Supply:	**-349**
	Supply to Demand Ratio:	**3.31**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

	SUPPLY :	**500**
	DEMAND:	**151**
	Demand minus Supply:	**-349**
	Supply to Demand Ratio:	**3.31**

Career Path: 11.1 Network Systems Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
110701	Computer Science				
	Awards at least 1 but less than 2 academic years	Yes	3	0	2
	Associate degrees	Yes	24	0	0
	Bachelor's degrees	Yes	220	57	119
	Masters degrees	Yes	60	145	114
	Doctoral degrees	Yes	5	26	19
			311	**228**	**254**
110801	Web Page, Digital/Multimedia & Information Resources Design				
	Awards of less than 1 academic year	Yes	4	24	15
	Associate degrees	Yes	44	325	211
	Bachelor's degrees	Yes	7	40	28
			54	**389**	**254**
110901	Computer Systems Networking and Telecommunications				
	Awards of less than 1 academic year	Yes	3	14	8
	Awards at least 1 but less than 2 academic years	Yes	1	0	2
	Associate degrees	Yes	125	553	413
			129	**567**	**423**
111002	System, Networking, and LAN/WAN Management/Manager				
	Awards of less than 1 academic year	Yes	3	30	17
	Awards at least 1 but less than 2 academic years	Yes	1	7	4
	Associate degrees	Yes	1	8	7
			5	**45**	**29**
	11.1 TOTAL SUPPLY		**500**	**1,229**	**960**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
151061	Database administrators	49
	Bachelor's degree	
151071	Network and computer systems administrators	203
	Bachelor's degree	
151081	Network systems and data communications analysts	202
	Bachelor's degree	
	11.1 TOTAL DEMAND	**454**

SUPPLY:	960
DEMAND:	454
Demand minus Supply:	-506
Supply to Demand Ratio:	2.12

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	912
DEMAND:	454
Demand minus Supply:	-458
Supply to Demand Ratio:	2.01

Career Path: 11.2 Information Support and Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
110101	Computer and Information Sciences, General				
	Awards at least 1 but less than 2 academic years	Yes	3	14	9
	Associate degrees	Yes	89	0	1
	Bachelor's degrees	Yes	173	53	118
	Masters degrees	Yes	28	0	2
	Doctoral degrees	Yes	2	0	0
			293	**67**	**129**
110103	Information Technology				
	Awards at least 1 but less than 2 academic years	Yes	10	61	40
	Associate degrees	Yes	75	0	77
	Bachelor's degrees	Yes	15	93	60
			100	**154**	**177**
110199	Computer and Information Sciences, Other				
	Associate degrees		2	24	13
	Bachelor's degrees		1	0	2
			4	**24**	**15**
110301	Data Processing and Data Processing Technology/Technician				
	Awards at least 1 but less than 2 academic years	Yes	10	0	3
			10	**0**	**3**
110401	Information Science/Studies				
	Awards of less than 1 academic year	Yes	3	0	2
	Associate degrees	Yes	25	0	9
	Bachelor's degrees	Yes	3	5	4
			31	**5**	**15**
111001	System Administration/Administrator				
	Associate degrees	Yes	5	20	17
	Bachelor's degrees	Yes	2	11	9
			6	**31**	**26**
111099	Computer/Information Technology Services Administration & Management, Other				
	Bachelor's degrees		1	0	1
	Masters degrees		0	5	3
			2	**5**	**4**
119999	Computer and Information Sciences & Support Services, Other				
	Awards of less than 1 academic year		2	0	0
	Awards at least 1 but less than 2 academic years		7	0	3
	Associate degrees		44	0	11
	Bachelor's degrees		7	7	9
			61	**7**	**23**
	11.2 TOTAL SUPPLY		**507**	**293**	**390**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
151041	Computer support specialists	295
	Associate degree	

Career Path: 11.2 Information Support and Services Pathway

| 151099 | Computer specialists, all other | 50 |
| | Associate degree | |

| | **11.2   TOTAL DEMAND** | **345** |

SUPPLY:	**390**
DEMAND:	**345**
Demand minus Supply:	**-45**
Supply to Demand Ratio:	**1.13**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**334**
DEMAND:	**345**
Demand minus Supply:	**11**
Supply to Demand Ratio:	**0.97**

Career Path: **11.3 Interactive Media Pathway**

SUPPLY

			Average Graduates		
CIP	**Program**	**STEM**	**2000-08**	**2018**	**2008-18**
110899	Computer Software and Media Applications, Other				
	Associate degrees		10	64	48
	Bachelor's degrees		0	0	1
			11	**64**	**49**
111004	Web/Multimedia Management and Webmaster				
	Bachelor's degrees	Yes	2	5	8
			2	**5**	**8**
	11.3 TOTAL SUPPLY		**12**	**69**	**57**

DEMAND

SUPPLY:	**57**
DEMAND:	**0**
Demand minus Supply:	**-57**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**57**
Demand minus Supply:	**-57**
Supply to Demand Ratio:	**-**

Career Path: **11.4 Programming and Software Development Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
110201	Computer Programming/Programmer, General				
	Awards at least 1 but less than 2 academic years	Yes	1	0	1
	Associate degrees	Yes	21	0	0
	Masters degrees	Yes	2	3	3
			25	**3**	**4**
110202	Computer Programming, Specific Applications				
	Awards of less than 1 academic year	Yes	15	54	44
			15	**54**	**44**
110203	Computer Programming, Vendor/Product Certification				
	Awards of less than 1 academic year	Yes	0	1	1
	Associate degrees	Yes	5	5	7
			5	**6**	**8**
110501	Computer Systems Analysis/Analyst				
	Awards of less than 1 academic year	Yes	1	0	1
	Awards at least 1 but less than 2 academic years	Yes	0	0	0
			2	**0**	**1**
111003	Computer and Information Systems Security				
	Associate degrees	Yes	12	90	58
	Bachelor's degrees	Yes	23	164	113
	Postbaccalaureate certificates	Yes	0	0	1
			35	**254**	**171**
140901	Computer Engineering, General				
	Bachelor's degrees	Yes	61	51	79
	Masters degrees	Yes	5	19	15
	Doctoral degrees	Yes	1	8	6
			67	**78**	**100**
	11.4 TOTAL SUPPLY		**149**	**395**	**328**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
113021	Computer and information systems managers	139
	Bachelor's or higher degree, plus work experience	
151021	Computer programmers	124
	Bachelor's degree	
151031	Computer software engineers, applications	130
	Bachelor's degree	
151032	Computer software engineers, systems software	82
	Bachelor's degree	
151051	Computer systems analysts	203
	Bachelor's degree	
	11.4 TOTAL DEMAND	**678**

	SUPPLY:	**328**
	DEMAND:	**678**
	Demand minus Supply:	**350**
	Supply to Demand Ratio:	**0.48**

Career Path: **11.4 Programming and Software Development Pathway**

Supply (Assoc or higher) / Demand (requires Assoc or higher)	
SUPPLY :	**281**
DEMAND:	**678**
Demand minus Supply:	**397**
Supply to Demand Ratio:	**0.41**

Career Path: 12.1 Correction Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
430199	Corrections and Criminal Justice, Other				
	Associate degrees		5	35	23
	Bachelor's degrees		9	0	1
			14	**35**	**24**
	12.1 TOTAL SUPPLY		**14**	**35**	**24**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
211029	Social workers, all other	17
	Bachelor's degree	
211092	Probation officers and correctional treatment specialists	87
	Bachelor's degree	
331011	First-line supervisors/managers of correctional officers	26
	Work experience in a related occupation	
333012	Correctional officers and jailers	309
	Moderate-term on-the-job training	
	12.1 TOTAL DEMAND	**439**

SUPPLY:	**24**
DEMAND:	**439**
Demand minus Supply:	**415**
Supply to Demand Ratio:	**0.05**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**24**
DEMAND:	**104**
Demand minus Supply:	**80**
Supply to Demand Ratio:	**0.23**

Career Path: **12.2 Emergency and Fire Management Services Pathway**

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
430203	Fire Science/Firefighting				
	Awards of less than 1 academic year		22	0	0
	Associate degrees		27	67	56
			49	**67**	**56**
	12.2 TOTAL SUPPLY		**49**	**67**	**56**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131061	Emergency management specialists Work experience in a related occupation	13
292041	Emergency medical technicians and paramedics Postsecondary vocational training	181
331021	First-line supervisors/managers of fire fighting and prevention workers Work experience in a related occupation	61
332011	Fire fighters Long-term on-the-job training	271
332021	Fire inspectors and investigators Work experience in a related occupation	9
332022	Forest fire inspectors and prevention specialists Work experience in a related occupation	3
435031	Police, fire, and ambulance dispatchers Moderate-term on-the-job training	111
	12.2 TOTAL DEMAND	**649**

SUPPLY:	**56**
DEMAND:	**649**
Demand minus Supply:	**593**
Supply to Demand Ratio:	**0.09**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**56**
Demand minus Supply:	**-56**
Supply to Demand Ratio:	**-**

Career Path: 12.3 Security and Protective Services Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
430109	Security and Loss Prevention Services				
	Awards of less than 1 academic year		0	0	0
			0	**0**	**0**
430112	Securities Services Administration/Management				
	Associate degrees		0	2	2
			0	**2**	**2**
439999	Security and Protective Services, Other				
	Awards of less than 1 academic year		1	10	8
			1	**10**	**8**
	12.3 TOTAL SUPPLY		**2**	**12**	**10**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
331099	First-line supervisors/managers, protective service workers, all other Work experience in a related occupation	27
339021	Private detectives and investigators Work experience in a related occupation	28
339031	Gaming surveillance officers and gaming investigators Moderate-term on-the-job training	1
339032	Security guards Short-term on-the-job training	681
339091	Crossing guards Short-term on-the-job training	79
339092	Lifeguards, ski patrol, and other recreational protective service workers Short-term on-the-job training	132
	12.3 TOTAL DEMAND	**948**

SUPPLY:	**10**
DEMAND:	**948**
Demand minus Supply:	**938**
Supply to Demand Ratio:	**0.01**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**2**
Demand minus Supply:	**-2**
Supply to Demand Ratio:	**-**

Career Path: **12.4 Law Enforcement Services Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
430103	Criminal Justice/Law Enforcement Administration				
	Associate degrees		24	243	150
	Bachelor's degrees		361	662	539
	Masters degrees		39	0	18
			425	**905**	**707**
430104	Criminal Justice/Safety Studies				
	Associate degrees		27	73	54
	Bachelor's degrees		25	88	66
			51	**161**	**120**
430106	Forensic Science and Technology				
	Bachelor's degrees		0	1	1
			0	**1**	**1**
430107	Criminal Justice/Police Science				
	Awards of less than 1 academic year		147	165	167
	Awards at least 1 but less than 2 academic years		0	1	2
	Associate degrees		89	96	87
			236	**262**	**256**
450401	Criminology				
	Bachelor's degrees		2	0	0
			2	**0**	**0**
	12.4 TOTAL SUPPLY		**714**	**1,329**	**1,083**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
194092	Forensic science technicians	11
	Bachelor's degree	
331012	First-line supervisors/managers of police and detectives	67
	Work experience in a related occupation	
333011	Bailiffs	9
	Moderate-term on-the-job training	
333041	Parking enforcement workers	4
	Short-term on-the-job training	
333051	Police and sheriff's patrol officers	466
	Long-term on-the-job training	
333052	Transit and railroad police	1
	Long-term on-the-job training	
339011	Animal control workers	14
	Moderate-term on-the-job training	
339099	Protective service workers, all other	143
	Short-term on-the-job training	
	12.4 TOTAL DEMAND	**715**

SUPPLY:	**1,083**
DEMAND:	**715**
Demand minus Supply:	**-368**
Supply to Demand Ratio:	**1.51**

Career Path: **12.4 Law Enforcement Services Pathway**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**914**
DEMAND:	**11**
Demand minus Supply:	**-903**
Supply to Demand Ratio:	**83.12**

Career Path: 12.5 Legal Services Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
220000	Legal Studies, General				
	Bachelor's degrees		3	8	8
			3	**8**	**8**
220001	Pre-Law Studies				
	Associate degrees		1	0	0
	Bachelor's degrees		0	3	2
			1	**3**	**2**
220101	Law (LL.B., J.D.)				
	First-professional degrees		481	493	481
			481	**493**	**481**
220202	Programs for Foreign Lawyers (LL.M., M.C.L.)				
	Masters degrees		7	52	35
			7	**52**	**35**
220301	Legal Administrative Assistant/Secretary				
	Awards at least 1 but less than 2 academic years		0	0	0
			0	**0**	**0**
220302	Legal Assistant/Paralegal				
	Awards of less than 1 academic year		15	0	18
	Awards at least 1 but less than 2 academic years		6	31	19
	Associate degrees		171	194	181
	Bachelor's degrees		16	12	12
	Postbaccalaureate certificates		38	45	21
			246	**282**	**251**
220303	Court Reporting/Court Reporter				
	Associate degrees		2	7	4
			2	**7**	**4**
229999	Legal Professions and Studies, Other				
	Masters degrees		2	0	2
			2	**0**	**2**
	12.5 TOTAL SUPPLY		**742**	**845**	**783**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
231011	Lawyers	203
	First professional degree	
231021	Administrative law judges, adjudicators, and hearing officers	6
	Bachelor's or higher degree, plus work experience	
231022	Arbitrators, mediators, and conciliators	2
	Bachelor's or higher degree, plus work experience	
231023	Judges, magistrate judges, and magistrates	4
	Bachelor's or higher degree, plus work experience	
232011	Paralegals and legal assistants	131
	Associate degree	
232092	Law clerks	9
	Bachelor's degree	

Career Path: 12.5 Legal Services Pathway

| 232099 | Legal support workers, all other | 4 |
| | Moderate-term on-the-job training | |

| | **12.5   TOTAL DEMAND** | **359** |

SUPPLY:	**783**
DEMAND:	**359**
Demand minus Supply:	**-424**
Supply to Demand Ratio:	**2.18**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**746**
DEMAND:	**355**
Demand minus Supply:	**-391**
Supply to Demand Ratio:	**2.10**

Career Path: 13.1 Production Pathway

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
480501	Machine Tool Technology/Machinist				
	Awards at least 1 but less than 2 academic years		1	4	2
	Associate degrees		0	1	1
	Awards at least 2 but less than 4 academic years		2	0	1
			4	**5**	**4**
480503	Machine Shop Technology/Assistant				
	Awards at least 1 but less than 2 academic years		8	22	12
	Associate degrees		4	0	0
			12	**22**	**12**
480507	Tool and Die Technology/Technician				
	Associate degrees		0	0	0
			0	**0**	**0**
480508	Welding Technology/Welder				
	Awards of less than 1 academic year		2	0	2
	Awards at least 1 but less than 2 academic years		20	26	25
	Associate degrees		3	0	0
			24	**26**	**27**
	13.1 TOTAL SUPPLY		**40**	**53**	**44**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
113051	Industrial production managers Work experience in a related occupation	120
435111	Weighers, measurers, checkers, and samplers, recordkeeping Short-term on-the-job training	46
511011	First-line supervisors/managers of production and operating workers Work experience in a related occupation	259
512011	Aircraft structure, surfaces, rigging, and systems assemblers Moderate-term on-the-job training	1
512021	Coil winders, tapers, and finishers Short-term on-the-job training	6
512022	Electrical and electronic equipment assemblers Short-term on-the-job training	40
512023	Electromechanical equipment assemblers Short-term on-the-job training	39
512031	Engine and other machine assemblers Short-term on-the-job training	9
512091	Fiberglass laminators and fabricators Moderate-term on-the-job training	35
512092	Team assemblers Moderate-term on-the-job training	1,088
512093	Timing device assemblers, adjusters, and calibrators Moderate-term on-the-job training	1
514011	Computer-controlled machine tool operators, metal and plastic Moderate-term on-the-job training	44
514012	Numerical tool and process control programmers Work experience in a related occupation	15
514021	Extruding and drawing machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	35

Career Path: 13.1 Production Pathway

514022	Forging machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	32
514023	Rolling machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	10
514031	Cutting, punching, and press machine setters, operators, and tenders, metal and plas Moderate-term on-the-job training	173
514032	Drilling and boring machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	11
514033	Grinding, lapping, polishing, and buffing machine tool setters, operators, and tenders Moderate-term on-the-job training	37
514034	Lathe and turning machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	26
514035	Milling and planing machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	10
514041	Machinists Long-term on-the-job training	152
514051	Metal-Refining Furnace Operators and Tenders Moderate-term on-the-job training	14
514052	Pourers and Casters, Metal Moderate-term on-the-job training	8
514061	Model makers, metal and plastic Long-term on-the-job training	1
514062	Patternmakers, metal and plastic Long-term on-the-job training	0
514071	Foundry mold and coremakers Moderate-term on-the-job training	49
514072	Molding, coremaking, and casting machine setters, operators, and tenders, metal an Moderate-term on-the-job training	50
514081	Multiple machine tool setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	41
514111	Tool and die makers Long-term on-the-job training	16
514121	Welders, cutters, solderers, and brazers Postsecondary vocational training	314
514122	Welding, soldering, and brazing machine setters, operators, and tenders Postsecondary vocational training	51
514191	Heat treating equipment setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	29
514192	Lay-out workers, metal and plastic Moderate-term on-the-job training	1
514193	Plating and coating machine setters, operators, and tenders, metal and plastic Moderate-term on-the-job training	15
514194	Tool grinders, filers, and sharpeners Moderate-term on-the-job training	8
516031	Sewing machine operators Moderate-term on-the-job training	37
516051	Sewers, hand Short-term on-the-job training	4
516061	Textile bleaching and dyeing machine operators and tenders Moderate-term on-the-job training	4
516062	Textile cutting machine setters, operators, and tenders Moderate-term on-the-job training	9
516063	Textile knitting and weaving machine setters, operators, and tenders Long-term on-the-job training	3
516064	Textile winding, twisting, and drawing out machine setters, operators, and tenders Moderate-term on-the-job training	17

Career Path: **13.1 Production Pathway**

516091	Extruding and forming machine setters, operators, and tenders, synthetic and glass fi Moderate-term on-the-job training	8
516092	Fabric and apparel patternmakers Long-term on-the-job training	2
516093	Upholsterers Long-term on-the-job training	10
517011	Cabinetmakers and bench carpenters Long-term on-the-job training	62
517021	Furniture finishers Long-term on-the-job training	10
517031	Model makers, wood Long-term on-the-job training	2
517032	Patternmakers, wood Long-term on-the-job training	0
517042	Woodworking machine setters, operators, and tenders, except sawing Moderate-term on-the-job training	37
518011	Nuclear Power Reactor Operators Long-term on-the-job training	0
518012	Power Distributors & Dispatchers Long-term on-the-job training	3
518013	Power Plant Operators Long-term on-the-job training	10
518091	Chemical plant and system operators Long-term on-the-job training	27
519011	Chemical equipment operators and tenders Moderate-term on-the-job training	12
519021	Crushing, grinding, and polishing machine setters, operators, and tenders Moderate-term on-the-job training	12
519022	Grinding and polishing workers, hand Moderate-term on-the-job training	22
519023	Mixing and blending machine setters, operators, and tenders Moderate-term on-the-job training	116
519031	Cutters and trimmers, hand Short-term on-the-job training	16
519032	Cutting and slicing machine setters, operators, and tenders Moderate-term on-the-job training	59
519041	Extruding, forming, pressing, and compacting machine setters, operators, and tender Moderate-term on-the-job training	115
519051	Furnace, kiln, oven, drier, and kettle operators and tenders Moderate-term on-the-job training	14
519061	Inspectors, testers, sorters, samplers, and weighers Moderate-term on-the-job training	197
519071	Jewelers and precious stone and metal workers Postsecondary vocational training	13
519111	Packaging and filling machine operators and tenders Short-term on-the-job training	186
519121	Coating, painting, and spraying machine setters, operators, and tenders Moderate-term on-the-job training	71
519122	Painters, transportation equipment Moderate-term on-the-job training	35
519123	Painting, coating, and decorating workers Short-term on-the-job training	20
519131	Photographic process workers Short-term on-the-job training	16
519132	Photographic processing machine operators Short-term on-the-job training	33

Career Path: **13.1 Production Pathway**

519191	Cementing and gluing machine operators and tenders Moderate-term on-the-job training	20
519192	Cleaning, washing, and metal pickling equipment operators and tenders Moderate-term on-the-job training	7
519193	Cooling and freezing equipment operators and tenders Moderate-term on-the-job training	3
519194	Etchers and engravers Long-term on-the-job training	1
519195	Molders, shapers, and casters, except metal and plastic Moderate-term on-the-job training	112
519196	Paper goods machine setters, operators, and tenders Moderate-term on-the-job training	50
519197	Tire builders Moderate-term on-the-job training	69
519198	Helpers--Production workers Short-term on-the-job training	333
537063	Machine feeders and offbearers Short-term on-the-job training	36

13.1   TOTAL DEMAND   **4,599**

SUPPLY:	**44**
DEMAND:	**4,599**
Demand minus Supply:	**4,555**
Supply to Demand Ratio:	**0.01**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**2**
Demand minus Supply:	**-2**
Supply to Demand Ratio:	**-**

Career Path: **13.2 Manufacturing Production Process Development Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
190901	Apparel and Textiles, General				
	Associate degrees		0	0	0
	Bachelor's degrees		36	92	70
			36	**92**	**70**
410301	Chemical Technology/Technician				
	Awards of less than 1 academic year	Yes	0	1	1
	Awards at least 1 but less than 2 academic years	Yes	2	13	9
	Associate degrees	Yes	6	0	0
			7	**14**	**10**
419999	Science Technologies/Technicians, Other				
	Associate degrees		189	155	144
	Bachelor's degrees		1	0	0
			189	**155**	**144**
	13.2 TOTAL SUPPLY		**233**	**261**	**223**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131023	Purchasing agents, except wholesale, retail, and farm products	143
	Long-term on-the-job training	
173026	Industrial engineering technicians	20
	Associate degree	
173027	Mechanical engineering technicians	13
	Associate degree	
472011	Boilermakers	9
	Long-term on-the-job training	
499044	Millwrights	49
	Long-term on-the-job training	
	13.2 TOTAL DEMAND	**234**

SUPPLY:	**223**
DEMAND:	**234**
Demand minus Supply:	**11**
Supply to Demand Ratio:	**0.95**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**213**
DEMAND:	**33**
Demand minus Supply:	**-180**
Supply to Demand Ratio:	**6.47**

Career Path: 13.3 Maintenance, Installation and Repair Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
150303	Electrical, Electronic & Communications Engineering Technology/Technician				
	Awards of less than 1 academic year	Yes	13	67	47
	Associate degrees	Yes	191	64	159
	Bachelor's degrees	Yes	29	63	66
			233	**194**	**272**
150399	Electrical & Electronic Engineering Technologies/Technicians, Other				
	Associate degrees		116	0	0
	Bachelor's degrees		18	0	0
			135	**0**	**0**
150401	Biomedical Technology/Technician				
	Associate degrees	Yes	1	0	0
			1	**0**	**0**
150403	Electromechanical Technology/Electromechanical Engineering Technology				
	Awards of less than 1 academic year	Yes	7	0	1
	Associate degrees	Yes	8	0	0
			15	**0**	**1**
150405	Robotics Technology/Technician				
	Awards at least 1 but less than 2 academic years	Yes	0	2	1
	Associate degrees	Yes	1	0	0
			1	**2**	**1**
150612	Industrial Technology/Technician				
	Awards of less than 1 academic year	Yes	1	0	0
	Awards at least 1 but less than 2 academic years	Yes	1	0	0
	Associate degrees	Yes	85	126	118
	Bachelor's degrees	Yes	56	0	22
	Masters degrees	Yes	9	10	9
			151	**136**	**148**
150613	Manufacturing Technology/Technician				
	Awards of less than 1 academic year	Yes	1	4	2
	Awards at least 1 but less than 2 academic years	Yes	1	5	3
	Associate degrees	Yes	2	19	12
	Bachelor's degrees	Yes	3	20	15
			7	**48**	**32**
150701	Occupational Safety and Health Technology/Technician				
	Associate degrees	Yes	1	0	0
			1	**0**	**0**
150805	Mechanical Engineering/Mechanical Technology/Technician				
	Associate degrees	Yes	27	11	13
	Bachelor's degrees	Yes	0	0	0
			27	**11**	**13**

Career Path: 13.3 Maintenance, Installation and Repair Pathway

151201	Computer Engineering Technology/Technician				
	Awards of less than 1 academic year	Yes	5	33	25
	Associate degrees	Yes	27	0	1
	Bachelor's degrees	Yes	15	2	4
			47	**35**	**29**
151202	Computer Technology/Computer Systems Technology				
	Awards of less than 1 academic year	Yes	3	0	3
	Associate degrees	Yes	28	45	31
			31	**45**	**34**
470000	Mechanics and Repairers, General				
	Associate degrees		3	26	17
			3	**26**	**17**
470101	Electrical/Electronics Equipment Installation & Repair, General				
	Awards at least 1 but less than 2 academic years		1	0	0
	Associate degrees		10	0	2
			11	**0**	**2**
470104	Computer Installation and Repair Technology/Technician				
	Awards at least 1 but less than 2 academic years		3	0	3
			3	**0**	**3**
470303	Industrial Mechanics and Maintenance Technology				
	Awards of less than 1 academic year		3	0	0
	Awards at least 1 but less than 2 academic years		10	8	9
	Associate degrees		5	0	0
			17	**8**	**9**
470399	Heavy/Industrial Equipment Maintenance Technologies, Other				
	Associate degrees		1	3	3
	Awards at least 2 but less than 4 academic years		8	10	11
			8	**13**	**13**
	13.3 TOTAL SUPPLY		**690**	**518**	**575**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
491011	First-line supervisors/managers of mechanics, installers, and repairers Work experience in a related occupation	272
492011	Computer, automated teller, and office machine repairers Postsecondary vocational training	41
492021	Radio mechanics Postsecondary vocational training	2
492022	Telecommunications equipment installers and repairers, except line installers Postsecondary vocational training	75
492092	Electric motor, power tool, and related repairers Postsecondary vocational training	27
492094	Electrical and electronics repairers, commercial and industrial equipment Postsecondary vocational training	33
492097	Electronic home entertainment equipment installers and repairers Postsecondary vocational training	33
492098	Security and fire alarm systems installers Postsecondary vocational training	44
493053	Outdoor power equipment and other small engine mechanics Moderate-term on-the-job training	15

Career Path: **13.3 Maintenance, Installation and Repair Pathway**

499041	Industrial machinery mechanics Long-term on-the-job training	124
499042	Maintenance and repair workers, general Moderate-term on-the-job training	732
499043	Maintenance workers, machinery Moderate-term on-the-job training	29
499062	Medical equipment repairers Associate degree	45
499063	Musical instrument repairers and tuners Long-term on-the-job training	3
499064	Watch repairers Long-term on-the-job training	1
499091	Coin, vending, and amusement machine servicers and repairers Moderate-term on-the-job training	36
499094	Locksmiths and safe repairers Moderate-term on-the-job training	7

13.3 TOTAL DEMAND	**1,519**

SUPPLY:	**575**
DEMAND:	**1,519**
Demand minus Supply:	**944**
Supply to Demand Ratio:	**0.38**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**481**
DEMAND:	**45**
Demand minus Supply:	**-436**
Supply to Demand Ratio:	**10.69**

Career Path: 13.4 Quality Assurance Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
150702	Quality Control Technology/Technician				
	Awards of less than 1 academic year	Yes	6	22	15
			6	**22**	**15**
	13.4 TOTAL SUPPLY		**6**	**22**	**15**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
519082	Medical appliance technicians	8
	Long-term on-the-job training	
	13.4 TOTAL DEMAND	**8**

SUPPLY:	**15**
DEMAND:	**8**
Demand minus Supply:	**-7**
Supply to Demand Ratio:	**1.85**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **13.5 Logistics and Inventory Control**

SUPPLY

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
435061	Production, planning, and expediting clerks Moderate-term on-the-job training	146
	13.5 TOTAL DEMAND	**146**

SUPPLY:	**0**
DEMAND:	**146**
Demand minus Supply:	**146**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **13.6 Health, Safety and Environmental Assurance**

SUPPLY

DEMAND

SUPPLY:	**0**
DEMAND:	**0**
Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **14.1 Management and Entrepreneurship Pathway**

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
521401	Marketing/Marketing Management, General				
	Bachelor's degrees		651	1,022	893
	Masters degrees		11	8	12
			662	**1,030**	**905**
521499	Marketing, Other				
	Bachelor's degrees		8	0	0
			8	**0**	**0**
	14.1 TOTAL SUPPLY		**670**	**1,030**	**905**

DEMAND

SUPPLY:	**905**
DEMAND:	**0**
Demand minus Supply:	**-905**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**905**
Demand minus Supply:	**-905**
Supply to Demand Ratio:	**-**

Career Path: 14.2 Professional Sales and Marketing Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
521501	Real Estate				
	Awards of less than 1 academic year		40	0	0
	Bachelor's degrees		7	0	0
			47	**0**	**0**
521804	Selling Skills and Sales Operations				
	Bachelor's degrees		10	0	0
			10	**0**	**0**
521902	Fashion Merchandising				
	Associate degrees		12	105	65
	Bachelor's degrees		13	36	28
			26	**141**	**93**
521909	Special Products Marketing Operations				
	Awards of less than 1 academic year		2	0	0
			2	**0**	**0**
	14.2 TOTAL SUPPLY		**84**	**141**	**94**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131022	Wholesale and retail buyers, except farm products	50
	Long-term on-the-job training	
271022	Fashion designers	19
	Associate degree	
271023	Floral designers	41
	Short-term on-the-job training	
271026	Merchandise displayers and window trimmers	66
	Moderate-term on-the-job training	
412031	Retail salespersons	3,026
	Short-term on-the-job training	
414011	Sales representatives, wholesale and manufacturing, technical and scientific product	328
	Work experience in a related occupation	
414012	Sales representatives, wholesale and manufacturing, except technical and scientific p	515
	Work experience in a related occupation	
419011	Demonstrators and product promoters	45
	Moderate-term on-the-job training	
419012	Models	1
	Moderate-term on-the-job training	
419021	Real estate brokers	52
	Work experience in a related occupation	
419022	Real estate sales agents	92
	Postsecondary vocational training	
419031	Sales engineers	42
	Bachelor's degree	
419041	Telemarketers	93
	Short-term on-the-job training	
419091	Door-to-door sales workers, news and street vendors, and related workers	58
	Short-term on-the-job training	
	14.2 TOTAL DEMAND	**4,428**

Career Path: **14.2 Professional Sales and Marketing Pathway**

SUPPLY:	**94**
DEMAND:	**4,428**
Demand minus Supply:	**4,335**
Supply to Demand Ratio:	**0.02**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**94**
DEMAND:	**61**
Demand minus Supply:	**-33**
Supply to Demand Ratio:	**1.53**

Career Path: 14.3 Buying and Merchandising Pathway

SUPPLY

			Average Graduates		
CIP	Program	STEM	2000-08	2018	2008-18
521801	Sales, Distribution, and Marketing Operations, General				
	Awards of less than 1 academic year		1	0	0
	Associate degrees		10	34	20
	Bachelor's degrees		2	2	3
			13	**36**	**24**
	14.3 TOTAL SUPPLY		**13**	**36**	**24**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
412011	Cashiers, except gaming	3,363
	Short-term on-the-job training	
412021	Counter and rental clerks	239
	Short-term on-the-job training	
433061	Procurement clerks	39
	Moderate-term on-the-job training	
434051	Customer service representatives	2,575
	Moderate-term on-the-job training	
434151	Order clerks	121
	Short-term on-the-job training	
439061	Office clerks, general	1,518
	Short-term on-the-job training	
536021	Parking lot attendants	72
	Short-term on-the-job training	
536031	Service station attendants	31
	Short-term on-the-job training	
	14.3 TOTAL DEMAND	**7,958**

SUPPLY:	**24**
DEMAND:	**7,958**
Demand minus Supply:	**7,934**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**24**
Demand minus Supply:	**-24**
Supply to Demand Ratio:	**-**

Career Path: **14.4 Marketing Communications and Promotion Pathway**

SUPPLY

DEMAND

SUPPLY:	**0**
DEMAND:	**0**
Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **14.5 Marketing Information Management and Research Pathway**

SUPPLY

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
193021	Market research analysts Bachelor's degree	96
	14.5 TOTAL DEMAND	**96**

SUPPLY:	**0**
DEMAND:	**96**
Demand minus Supply:	**96**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

DEMAND:	**96**
Demand minus Supply:	**96**
Supply to Demand Ratio:	**0.00**

Career Path: **14.6 Distribution and Logistics Pathway**

SUPPLY

DEMAND

SUPPLY:	**0**
DEMAND:	**0**
Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: 14.7 E-Marketing Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
520208	E-Commerce/Electronic Commerce				
	Awards of less than 1 academic year		0	0	1
	Awards at least 1 but less than 2 academic years		0	1	1
	Associate degrees		4	22	18
	Bachelor's degrees		4	27	18
	Masters degrees		1	12	7
			10	**62**	**44**
	14.7 TOTAL SUPPLY		**10**	**62**	**44**

DEMAND

SUPPLY:	**44**
DEMAND:	**0**
Demand minus Supply:	**-44**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**42**
Demand minus Supply:	**-42**
Supply to Demand Ratio:	**-**

Career Path: 15.1 Engineering and Technology Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
140101	Engineering, General				
	Associate degrees	Yes	3	1	4
	Bachelor's degrees	Yes	88	0	32
	Masters degrees	Yes	17	19	15
	Doctoral degrees	Yes	11	21	19
			119	**41**	**70**
140201	Aerospace, Aeronautical and Astronautical Engineering				
	Bachelor's degrees	Yes	16	47	35
	Masters degrees	Yes	5	15	11
	Doctoral degrees	Yes	1	0	1
			22	**62**	**46**
140301	Agricultural/Biological Engineering and Bioengineering				
	Bachelor's degrees	Yes	6	5	5
	Masters degrees	Yes	4	12	9
	Doctoral degrees	Yes	1	4	3
			11	**21**	**16**
140401	Architectural Engineering				
	Bachelor's degrees	Yes	12	10	12
			12	**10**	**12**
140501	Biomedical/Medical Engineering				
	Bachelor's degrees	Yes	68	152	121
	Masters degrees	Yes	28	32	35
	Doctoral degrees	Yes	9	25	20
			104	**209**	**176**
140701	Chemical Engineering				
	Bachelor's degrees		75	17	36
	Masters degrees		16	5	7
	Doctoral degrees		7	16	13
			98	**38**	**55**
140801	Civil Engineering, General				
	Bachelor's degrees	Yes	169	123	139
	Masters degrees	Yes	54	94	70
	Doctoral degrees	Yes	7	23	16
			230	**240**	**225**
141001	Electrical, Electronics and Communications Engineering				
	Bachelor's degrees	Yes	192	42	93
	Masters degrees	Yes	83	145	129
	Doctoral degrees	Yes	14	16	19
			290	**203**	**241**
141101	Engineering Mechanics				
	Bachelor's degrees	Yes	4	33	20
			4	**33**	**20**

Career Path: 15.1 Engineering and Technology Pathway

141201	Engineering Physics				
	Bachelor's degrees	Yes	2	2	1
			2	**2**	**1**
141301	Engineering Science				
	Bachelor's degrees	Yes	45	209	141
	Masters degrees	Yes	8	20	16
	Doctoral degrees	Yes	2	0	1
			55	**229**	**158**
141401	Environmental/Environmental Health Engineering				
	Masters degrees	Yes	16	14	16
	Doctoral degrees	Yes	2	7	4
			18	**21**	**20**
141801	Materials Engineering				
	Bachelor's degrees	Yes	5	1	3
	Masters degrees	Yes	6	17	12
	Doctoral degrees	Yes	7	40	26
			18	**58**	**41**
141901	Mechanical Engineering				
	Bachelor's degrees	Yes	227	216	233
	Masters degrees	Yes	53	67	59
	Doctoral degrees	Yes	7	16	11
			287	**299**	**303**
142001	Metallurgical Engineering				
	Masters degrees	Yes	2	0	0
	Doctoral degrees	Yes	1	0	0
			2	**0**	**0**
142301	Nuclear Engineering				
	Bachelor's degrees	Yes	14	60	45
	Postbaccalaureate certificates	Yes	1	3	3
	Masters degrees	Yes	11	27	21
	Doctoral degrees	Yes	3	0	1
			29	**90**	**70**
142701	Systems Engineering				
	Doctoral degrees	Yes	1	4	3
			1	**4**	**3**
143201	Polymer/Plastics Engineering				
	Masters degrees	Yes	3	3	2
	Doctoral degrees	Yes	2	0	1
			5	**3**	**3**
143501	Industrial Engineering				
	Bachelor's degrees	Yes	42	0	6
	Masters degrees	Yes	28	0	0
	Doctoral degrees	Yes	1	8	7
			71	**8**	**13**

Career Path: 15.1 Engineering and Technology Pathway

149999	Engineering, Other				
	Associate degrees		0	0	0
	Bachelor's degrees		1	0	0
	Masters degrees		19	0	3
			19	**0**	**3**
150000	Engineering Technology, General				
	Associate degrees	Yes	43	244	153
	Bachelor's degrees	Yes	108	152	128
	Masters degrees	Yes	38	0	6
			189	**396**	**288**
151501	Engineering/Industrial Management				
	Bachelor's degrees	Yes	31	198	137
	Masters degrees	Yes	9	30	24
			40	**228**	**161**
159999	Engineering Technologies/Technicians, Other				
	Associate degrees		0	0	0
	Bachelor's degrees		6	0	7
	Masters degrees		2	0	0
			8	**0**	**7**
	15.1 TOTAL SUPPLY		**1,636**	**2,195**	**1,929**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
119041	Engineering managers Bachelor's or higher degree, plus work experience	64
172011	Aerospace engineers Bachelor's degree	12
172021	Agricultural engineers Bachelor's degree	5
172041	Chemical engineers Bachelor's degree	20
172061	Computer hardware engineers Bachelor's degree	24
172071	Electrical engineers Bachelor's degree	47
172072	Electronics engineers, except computer Bachelor's degree	50
172111	Health and safety engineers, except mining safety engineers and inspectors Bachelor's degree	14
172112	Industrial engineers Bachelor's degree	141
172131	Materials engineers Bachelor's degree	5
172141	Mechanical engineers Bachelor's degree	102
172151	Mining and geological engineers, including mining safety engineers Bachelor's degree	1
172161	Nuclear engineers Bachelor's degree	5
172171	Petroleum engineers Bachelor's degree	2

Career Path: 15.1 Engineering and Technology Pathway

172199	Engineers, all other Bachelor's degree	60
173011	Architectural and civil drafters Postsecondary vocational training	37
173012	Electrical and electronics drafters Postsecondary vocational training	16
173023	Electrical and electronic engineering technicians Associate degree	39
173024	Electro-mechanical technicians Associate degree	2
173029	Engineering technicians, except drafters, all other Associate degree	8
173031	Surveying and mapping technicians Moderate-term on-the-job training	23
273042	Technical writers Bachelor's degree	7

15.1 TOTAL DEMAND	**684**

SUPPLY:	**1,929**
DEMAND:	**684**
Demand minus Supply:	**-1,245**
Supply to Demand Ratio:	**2.82**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**1,929**
DEMAND:	**608**
Demand minus Supply:	**-1,321**
Supply to Demand Ratio:	**3.17**

Career Path: **15.2 Science and Mathematics Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
143101	Materials Science				
	Masters degrees	Yes	1	5	4
	Doctoral degrees	Yes	1	4	4
			2	**9**	**8**
260101	Biology/Biological Sciences, General				
	Associate degrees	Yes	0	3	2
	Bachelor's degrees	Yes	910	1,135	1,051
	Masters degrees	Yes	55	42	43
	Doctoral degrees	Yes	7	29	24
			972	**1,209**	**1,119**
260102	Biomedical Sciences, General				
	Bachelor's degrees	Yes	3	26	16
	Masters degrees	Yes	1	1	1
	Doctoral degrees	Yes	2	20	13
			6	**47**	**30**
260202	Biochemistry				
	Bachelor's degrees	Yes	25	46	38
	Masters degrees	Yes	4	1	2
	Doctoral degrees	Yes	14	0	5
			43	**47**	**44**
260203	Biophysics				
	Bachelor's degrees	Yes	1	3	3
	Masters degrees	Yes	0	0	0
			1	**3**	**3**
260204	Molecular Biology				
	Bachelor's degrees	Yes	27	79	45
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	3	0	0
			30	**79**	**45**
260209	Radiation Biology/Radiobiology				
	Awards at least 1 but less than 2 academic years	Yes	0	0	0
	Associate degrees	Yes	7	0	0
			7	**0**	**0**
260210	Biochemistry/Biophysics and Molecular Biology				
	Bachelor's degrees	Yes	1	8	5
			1	**8**	**5**
260301	Botany/Plant Biology				
	Bachelor's degrees	Yes	1	0	0
	Masters degrees	Yes	2	0	0
	Doctoral degrees	Yes	2	0	1
			4	**0**	**1**

Career Path: 15.2 Science and Mathematics Pathway

260401	Cell/Cellular Biology and Histology				
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	4	0	0
			4	**0**	**0**
260403	Anatomy				
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	5	11	8
			5	**11**	**9**
260406	Cell/Cellular and Molecular Biology				
	Bachelor's degrees	Yes	0	2	2
	Masters degrees	Yes	0	2	2
	Doctoral degrees	Yes	5	38	25
			6	**42**	**28**
260499	Cell/Cellular Biology and Anatomical Sciences, Other				
	Bachelor's degrees		9	0	7
			9	**0**	**7**
260502	Microbiology, General				
	Masters degrees	Yes	1	5	3
	Doctoral degrees	Yes	4	36	21
			5	**41**	**24**
260503	Medical Microbiology and Bacteriology				
	Bachelor's degrees	Yes	7	0	0
	Masters degrees	Yes	3	0	0
	Doctoral degrees	Yes	12	0	0
			22	**0**	**0**
260701	Zoology/Animal Biology				
	Bachelor's degrees	Yes	2	0	0
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	1	0	0
			3	**0**	**0**
260707	Animal Physiology				
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	4	0	0
			4	**0**	**0**
260806	Human/Medical Genetics				
	Masters degrees	Yes	0	1	1
	Doctoral degrees	Yes	1	5	4
			1	**6**	**5**
260901	Physiology, General				
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	2	0	2
			2	**0**	**2**
260902	Molecular Physiology				
	Masters degrees	Yes	1	5	3
	Doctoral degrees	Yes	4	27	20
			5	**32**	**23**

Career Path: 15.2 Science and Mathematics Pathway

260910	Pathology/Experimental Pathology				
	Masters degrees	Yes	0	0	0
	Doctoral degrees	Yes	4	0	2
			5	**0**	**2**
260911	Oncology and Cancer Biology				
	Masters degrees	Yes	1	6	4
	Doctoral degrees	Yes	4	28	20
			5	**34**	**24**
261001	Pharmacology				
	Masters degrees	Yes	0	1	1
	Doctoral degrees	Yes	12	7	8
			12	**8**	**8**
261101	Biometry/Biometrics				
	Masters degrees	Yes	0	0	0
			0	**0**	**0**
261102	Biostatistics				
	Masters degrees	Yes	3	0	2
			3	**0**	**2**
261103	Bioinformatics				
	Masters degrees	Yes	2	12	9
	Doctoral degrees	Yes	0	1	1
			2	**13**	**11**
261199	Biomathematics and Bioinformatics, Other				
	Masters degrees		0	1	2
			0	**1**	**2**
261301	Ecology				
	Bachelor's degrees	Yes	0	0	0
	Masters degrees	Yes	4	6	5
	Doctoral degrees	Yes	4	8	6
			8	**14**	**10**
261305	Environmental Biology				
	Bachelor's degrees	Yes	3	26	16
			3	**26**	**16**
261309	Epidemiology				
	Postbaccalaureate certificates	Yes	2	19	10
	Masters degrees	Yes	7	0	5
			9	**19**	**15**
261399	Ecology, Evolution, Systematics & Population Biology, Other				
	Bachelor's degrees		4	32	22
			4	**32**	**22**
269999	Biological and Biomedical Sciences, Other				
	Bachelor's degrees		12	0	5
	Masters degrees		6	11	14
	Doctoral degrees		11	11	15
			29	**22**	**34**

Career Path: **15.2 Science and Mathematics Pathway**

270101	Mathematics, General				
	Bachelor's degrees	Yes	242	328	293
	Masters degrees	Yes	65	22	42
	Doctoral degrees	Yes	14	13	11
			321	**363**	**346**
270301	Applied Mathematics				
	Bachelor's degrees	Yes	6	17	14
			6	**17**	**14**
270501	Statistics, General				
	Bachelor's degrees	Yes	11	20	15
	Postbaccalaureate certificates	Yes	2	8	6
	Masters degrees	Yes	11	11	11
			24	**39**	**31**
300101	Biological and Physical Sciences				
	Bachelor's degrees		19	61	48
			19	**61**	**48**
300601	Systems Science and Theory				
	Masters degrees		8	61	36
			8	**61**	**36**
300801	Mathematics and Computer Science				
	Bachelor's degrees		6	3	4
			6	**3**	**4**
301101	Gerontology				
	Postbaccalaureate certificates		3	8	7
			3	**8**	**7**
301301	Medieval and Renaissance Studies				
	Bachelor's degrees		1	0	0
			1	**0**	**0**
301501	Science, Technology and Society				
	Bachelor's degrees		2	10	8
			2	**10**	**8**
301701	Behavioral Sciences				
	Bachelor's degrees		10	43	40
			10	**43**	**40**
301801	Natural Sciences				
	Bachelor's degrees		1	7	4
			1	**7**	**4**
302001	International/Global Studies				
	Bachelor's degrees		4	25	22
			4	**25**	**22**
302202	Classical, Ancient Mediterranean, and Near Eastern/Asian Studies and Archaeology				
	Bachelor's degrees		1	6	3
			1	**6**	**3**

Career Path: 15.2 Science and Mathematics Pathway

302401	Neuroscience				
	Bachelor's degrees		40	65	64
	Doctoral degrees		4	12	13
			44	**77**	**78**
302501	Cognitive Science				
	Bachelor's degrees		8	47	36
			8	**47**	**36**
309999	Multi-/Interdisciplinary Studies, Other				
	Associate degrees		2	1	1
	Bachelor's degrees		1,274	1,777	1,510
	Masters degrees		15	0	7
	Doctoral degrees		4	4	3
			1,295	**1,782**	**1,521**
400101	Physical Sciences				
	Bachelor's degrees	Yes	15	26	18
			15	**26**	**18**
400501	Chemistry, General				
	Associate degrees	Yes	0	2	1
	Bachelor's degrees	Yes	244	333	305
	Masters degrees	Yes	28	22	23
	Doctoral degrees	Yes	28	49	39
			300	**406**	**367**
400599	Chemistry, Other				
	Bachelor's degrees		2	9	7
			2	**9**	**7**
400601	Geology/Earth Science, General				
	Bachelor's degrees	Yes	60	69	64
	Postbaccalaureate certificates	Yes	1	6	4
	Masters degrees	Yes	15	5	11
	Doctoral degrees	Yes	3	7	6
			78	**87**	**85**
400603	Geophysics and Seismology				
	Masters degrees	Yes	2	25	13
	Doctoral degrees	Yes	1	6	3
			3	**31**	**16**
400801	Physics, General				
	Bachelor's degrees	Yes	56	97	83
	Masters degrees	Yes	19	58	41
	Doctoral degrees	Yes	16	14	11
			90	**169**	**135**
400802	Atomic/Molecular Physics				
	Bachelor's degrees	Yes	0	1	1
			0	**1**	**1**
400899	Physics, Other				
	Bachelor's degrees		0	0	0
			0	**0**	**0**

Career Path: 15.2 Science and Mathematics Pathway

450201	Anthropology			
	Bachelor's degrees	134	172	160
	Masters degrees	21	20	19
	Doctoral degrees	6	7	7
		161	**199**	**186**
450299	Anthropology, Other			
	Bachelor's degrees	1	0	2
		1	**0**	**2**
450301	Archeology			
	Bachelor's degrees	2	5	4
		2	**5**	**4**
450601	Economics, General			
	Associate degrees	0	1	1
	Bachelor's degrees	364	211	314
	Masters degrees	39	64	60
	Doctoral degrees	8	10	7
		411	**286**	**382**
450604	Development Economics and International Development			
	Masters degrees	1	17	8
		1	**17**	**8**
450605	International Economics			
	Bachelor's degrees	6	15	13
		6	**15**	**13**
450699	Economics, Other			
	Bachelor's degrees	4	0	1
		4	**0**	**1**
450701	Geography			
	Bachelor's degrees	49	38	49
	Masters degrees	10	3	6
	Doctoral degrees	3	7	6
		63	**48**	**61**
450702	Cartography			
	Awards of less than 1 academic year	9	4	4
	Associate degrees	5	27	17
	Postbaccalaureate certificates	1	7	4
		15	**38**	**25**
450799	Geography, Other N			
	Bachelor's degrees	1	5	3
		1	**5**	**3**
511401	Medical Scientist (MS, PhD)			
	Masters degrees	8	76	44
		8	**76**	**44**

Career Path: 15.2 Science and Mathematics Pathway

540101	History, General				
		Associate degrees	0	0	0
		Bachelor's degrees	559	733	660
		Masters degrees	45	66	56
		Doctoral degrees	8	8	11
			612	**807**	**727**
540102	American History (United States)				
		Bachelor's degrees	0	1	1
			0	**1**	**1**
540105	Public/Applied History and Archival Administration				
		Postbaccalaureate certificates	0	2	2
		Doctoral degrees	0	0	1
			1	**2**	**2**
540199	History, Other				
		Bachelor's degrees	11	72	48
		Masters degrees	0	1	1
			12	**73**	**49**
	15.2 TOTAL SUPPLY		**4,748**	**6,553**	**5,831**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
151011	Computer and information scientists, research	5
	Doctoral degree	
152021	Mathematicians	1
	Doctoral degree	
152041	Statisticians	15
	Master's degree	
191022	Microbiologists	7
	Doctoral degree	
191029	Biological scientists, all other	3
	Doctoral degree	
191031	Conservation scientists	2
	Bachelor's degree	
191099	Life scientists, all other	6
	Bachelor's degree	
192011	Astronomers	0
	Doctoral degree	
192012	Physicists	9
	Doctoral degree	
192021	Atmospheric and space scientists	3
	Bachelor's degree	
192031	Chemists	40
	Bachelor's degree	
192032	Materials scientists	7
	Bachelor's degree	
192041	Environmental scientists and specialists, including health	62
	Master's degree	
192042	Geoscientists, except hydrologists and geographers	8
	Master's degree	
192043	Hydrologists	1
	Master's degree	

Career Path: 15.2 Science and Mathematics Pathway

193022	Survey researchers Bachelor's degree	10
193091	Anthropologists and archeologists Master's degree	5
193092	Geographers Master's degree	1
193093	Historians Master's degree	3
193094	Political scientists Master's degree	3
194011	Agricultural and food science technicians Associate degree	7
194021	Biological technicians Bachelor's degree	47
194031	Chemical technicians Associate degree	23
194051	Nuclear technicians Associate degree	3
194061	Social science research assistants Associate degree	9
194099	Life, physical, and social science technicians, all other Associate degree	20

15.2 TOTAL DEMAND	**300**

SUPPLY:	**5,831**
DEMAND:	**300**
Demand minus Supply:	**-5,531**
Supply to Demand Ratio:	**19.44**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**5,827**
DEMAND:	**300**
Demand minus Supply:	**-5,527**
Supply to Demand Ratio:	**19.42**

Career Path: **16.1 Transportation Operations Pathway**

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	2018	2008-18
150801	Aeronautical/Aerospace Engineering Technology/Technician				
	Bachelor's degrees	Yes	8	0	4
			8	**0**	**4**
490101	Aeronautics/Aviation/Aerospace Science & Technology, General				
	Bachelor's degrees		100	308	227
			100	**308**	**227**
490104	Aviation/Airway Management and Operations				
	Masters degrees		2	7	5
			2	**7**	**5**
	16.1 TOTAL SUPPLY		**111**	**315**	**236**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
113071	Transportation, storage, and distribution managers Work experience in a related occupation	87
396031	Flight attendants Long-term on-the-job training	24
435032	Dispatchers, except police, fire, and ambulance Moderate-term on-the-job training	90
531011	Aircraft cargo handling supervisors Work experience in a related occupation	2
532011	Airline pilots, copilots, and flight engineers Bachelor's degree	38
532012	Commercial pilots Postsecondary vocational training	25
532021	Air traffic controllers Long-term on-the-job training	31
532022	Airfield operations specialists Long-term on-the-job training	2
533011	Ambulance drivers and attendants, except emergency medical technicians Moderate-term on-the-job training	33
533021	Bus drivers, transit and intercity Moderate-term on-the-job training	99
533022	Bus drivers, school Moderate-term on-the-job training	196
533032	Truck drivers, heavy and tractor-trailer Short-term on-the-job training	1,925
533033	Truck drivers, light or delivery services Short-term on-the-job training	377
533041	Taxi drivers and chauffeurs Short-term on-the-job training	66
534021	Railroad brake, signal, and switch operators Moderate-term on-the-job training	30
534041	Subway and streetcar operators Moderate-term on-the-job training	0
535011	Sailors and marine oilers Short-term on-the-job training	42
535021	Captains, mates, and pilots of water vessels Work experience in a related occupation	51

Career Path: **16.1 Transportation Operations Pathway**

535022	Motorboat operators	1
	Moderate-term on-the-job training	
535031	Ship engineers	21
	Work experience in a related occupation	
536011	Bridge and lock tenders	2
	Short-term on-the-job training	
537051	Industrial truck and tractor operators	539
	Short-term on-the-job training	

16.1   TOTAL DEMAND   **3,681**

SUPPLY:	**236**
DEMAND:	**3,681**
Demand minus Supply:	**3,445**
Supply to Demand Ratio:	**0.06**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	**236**
DEMAND:	**38**
Demand minus Supply:	**-198**
Supply to Demand Ratio:	**6.20**

Career Path: **16.2 Logistics Planning and Management Services Pathway**

SUPPLY

- -

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
131081	Logisticians	54
	Bachelor's degree	
	16.2 TOTAL DEMAND	**54**

SUPPLY:	**0**
DEMAND:	**54**
Demand minus Supply:	**54**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

DEMAND:	**54**
Demand minus Supply:	**54**
Supply to Demand Ratio:	**0.00**

- -

Career Path: 16.3 Warehousing and Distribution Center Operations Pathway

SUPPLY

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
435071	Shipping, receiving, and traffic clerks Short-term on-the-job training	485
531021	First-line supervisors/managers of helpers, laborers, and material movers, hand Work experience in a related occupation	99
531031	First-line supervisors/managers of transportation and material-moving machine and Work experience in a related occupation	92
537062	Laborers and freight, stock, and material movers, hand Short-term on-the-job training	2,545
537064	Packers and packagers, hand Short-term on-the-job training	268
537121	Tank car, truck, and ship loaders Moderate-term on-the-job training	11
	16.3 TOTAL DEMAND	**3,500**

SUPPLY:	**0**
DEMAND:	**3,500**
Demand minus Supply:	**3,500**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: 16.4 Facility and Mobile Equipment Maintenance Pathway

SUPPLY

CIP	Program	STEM	Average Graduates		
			2000-08	**2018**	**2008-18**
470603	Autobody/Collision and Repair Technology/Technician				
	Awards at least 1 but less than 2 academic years		255	558	433
	Associate degrees		15	15	19
			270	**573**	**451**
470604	Automobile/Automotive Mechanics Technology/Technician				
	Awards at least 1 but less than 2 academic years		604	511	470
	Associate degrees		58	94	81
			662	**605**	**550**
470605	Diesel Mechanics Technology/Technician				
	Awards at least 1 but less than 2 academic years		90	335	242
	Associate degrees		14	56	41
			104	**391**	**283**
470607	Airframe Mechanics & Aircraft Maintenance Technology/Technician				
	Awards of less than 1 academic year		62	0	0
	Awards at least 1 but less than 2 academic years		13	17	21
			75	**17**	**21**
470608	Aircraft Powerplant Technology/Technician				
	Awards of less than 1 academic year		64	65	88
	Awards at least 1 but less than 2 academic years		5	9	5
			69	**74**	**93**
470609	Avionics Maintenance Technology/Technician				
	Associate degrees		50	62	54
			50	**62**	**54**
470613	Medium/Heavy Vehicle and Truck Technology/Technician				
	Awards at least 1 but less than 2 academic years		1	4	4
			1	**4**	**4**
470614	Alternative Fuel Vehicle Technology/Technician				
	Awards at least 1 but less than 2 academic years		22	135	128
			22	**135**	**128**
470615	Engine Machinist				
	Awards at least 1 but less than 2 academic years		2	12	13
			2	**12**	**13**
470699	Vehicle Maintenance and Repair Technologies, Other.				
	Awards at least 1 but less than 2 academic years		37	199	136
	Associate degrees		4	24	15
			41	**223**	**151**
479999	Mechanic and Repair Technologies/Technicians, Other				
	Awards of less than 1 academic year		12	8	14
	Awards at least 1 but less than 2 academic years		15	104	90
	Associate degrees		4	0	0
	Awards at least 2 but less than 4 academic years		9	0	0
			41	**112**	**104**
	16.4 TOTAL SUPPLY		**1,335**	**2,208**	**1,851**

Career Path: **16.4 Facility and Mobile Equipment Maintenance Pathway**

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
173021	Aerospace engineering and operations technicians Associate degree	2
474061	Rail-track laying and maintenance equipment operators Moderate-term on-the-job training	3
492091	Avionics technicians Postsecondary vocational training	7
492093	Electrical and electronics installers and repairers, transportation equipment Postsecondary vocational training	25
492096	Electronic equipment installers and repairers, motor vehicles Postsecondary vocational training	12
493011	Aircraft mechanics and service technicians Postsecondary vocational training	50
493021	Automotive body and related repairers Long-term on-the-job training	101
493022	Automotive glass installers and repairers Long-term on-the-job training	13
493023	Automotive service technicians and mechanics Postsecondary vocational training	280
493031	Bus and truck mechanics and diesel engine specialists Postsecondary vocational training	174
493042	Mobile heavy equipment mechanics, except engines Long-term on-the-job training	77
493043	Rail car repairers Long-term on-the-job training	10
493051	Motorboat mechanics Long-term on-the-job training	12
493052	Motorcycle mechanics Long-term on-the-job training	14
493091	Bicycle repairers Moderate-term on-the-job training	2
493092	Recreational vehicle service technicians Long-term on-the-job training	11
493093	Tire repairers and changers Short-term on-the-job training	55
537061	Cleaners of vehicles and equipment Short-term on-the-job training	222
	16.4 TOTAL DEMAND	**1,070**

SUPPLY:	1,851
DEMAND:	1,070
Demand minus Supply:	-781
Supply to Demand Ratio:	1.73

Supply (Assoc or higher) / Demand (requires Assoc or higher)

SUPPLY :	209
DEMAND:	2
Demand minus Supply:	-207
Supply to Demand Ratio:	104.50

Career Path: **16.5 Transportation Systems/ Infrastructure Planning, Management, and Regulation Pathway**

SUPPLY

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
536041	Traffic technicians	37
	Short-term on-the-job training	
	16.5 TOTAL DEMAND	**37**

SUPPLY:	**0**
DEMAND:	**37**
Demand minus Supply:	**37**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **16.6 Health, Safety and Environmental Management Pathway**

SUPPLY

DEMAND

SUPPLY:	**0**
DEMAND:	**0**
Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

Career Path: **16.7 Sales and Service Pathway**

SUPPLY

. . . .

DEMAND

SOC	Occupation	Average Annual Openings, 2008-18
433021	Billing and posting clerks and machine operators Short-term on-the-job training	328
435011	Cargo and freight agents Moderate-term on-the-job training	50
	16.7 TOTAL DEMAND	**378**

SUPPLY:	**0**
DEMAND:	**378**
Demand minus Supply:	**378**
Supply to Demand Ratio:	**0.00**

Supply (Assoc or higher) / Demand (requires Assoc or higher)

Demand minus Supply:	**0**
Supply to Demand Ratio:	**-**

APPENDIX 7: HIGH-NEED FIELD CROSSWALK

Each year, public institutions of higher education in Tennessee participate in the Performance Funding program, an assessment process which allows institutions to earn additional funding (up to 5.45 percent of the institution's state appropriation) based on a common set of quality measures.

During the 2010-15 cycle, the Tennessee Higher Education Commission provided institutions with the option to select a new student sub-population, High-Need Fields, for inclusion as a Performance Funding standard. This option gives institutions the opportunity to focus on student success in enrolling in, persisting in, and completing degree programs that have been identified as "high need."

The table included in this appendix is extracted in part from the more detailed and comprehensive tables presented in **Appendix 6**. However, it is important to note that in certain cases in this appendix, specifically nursing and teaching, data were utilized from outside the current study. In both instances, inclusion was based on recent well-established reports that indicate a future deficit of teachers and nurses in Tennessee.

The 2009 Tennessee Center for Nursing Supply and Demand Forecast, which was based on updated models of previous research by the federal Health Resources and Services Administration, provides a projection of the need for registered nurses in Tennessee over the next ten years. The forecast is available online at www.centerfornursing.org. Based on this study, Tennessee can expect an increasing deficit of registered nurses as the decade progresses, reaching an eventual shortage of 14,910 RNs in 2020.

The identification of the Teaching and Training pathway as a high-need field was supported by a recent CBER study, "Supply and Demand for Teachers in Tennessee," available online at http://cber.utk.edu/pubs/bfox269.pdf. This December 2009 report found that a gap in teacher supply (the available graduates and other teacher sources) would reach 31,431 teachers by 2014. CBER also concluded that even with the usual teacher supply pipelines operating, the deficit will only be reduced by half, indicating that attainment among students at Tennessee's current teacher preparation programs, as well as the availability of alternative routes to certification, is of optimum importance.

Instructions for Institutional Usage in Performance Funding

Institutions that select the High-Need subpopulation for inclusion in the Performance Funding program will need to utilize the information in the table below to determine which academic programs are eligible to be submitted as a High-Need program. This document correlates occupational fields with academic offerings, and CIPs are listed according to the broad "career pathway" developed by the U.S. Department of Education, all of which are eligible CIPs that may be submitted as a High-Need field.

This table includes degrees at all levels, from college-level certificates and Associate's degrees to post-graduate offerings. Once an institution elects to participate in the High-Need field portion of Performance Funding, it needs to select which CIPs are part of its academic catalog and enter that information on the Performance Funding Sub-Population form.

It is important to note that if an institution has selected Health Programs or Science, Technology, Engineering or Mathematics (STEM) Programs as a student sub-population, the High-Need CIPs that are selected must not be from these fields. Health and STEM CIPs are denoted with an asterisk on the Crosswalk table.

Career Pathway	CIP	Average Openings 2008-18	Average Annual Graduate Deficit
11.4 Programming and Software Development		**678**	**-397**
Computer Programming/Programmer, General *	11.0201		
Computer Programming, Specific Applications *	11.0202		
Computer Programming, Vendor/Product Certification *	11.0203		
Computer Systems Analysis/Analyst *	11.0501		
Computer and Information Systems Security *	11.1003		
Computer Engineering*	14.0901		
4.5 Marketing		**397**	**-360**
Public Relations, Advertising & Applied Communication	09.9099		
4.3 Human Resources		**447**	**-307**
Human Resources Management, General	52.1001		
Organizational Behavior studies	52.1003		
Human Resources Development	52.1005		
Human Resources Management and Services	52.1099		
1.6 Environmental Service Systems		**149**	**-149**
Environmental Engineering Technology *	15.0507		
2.2 Construction		**200**	**-112**
Energy Management and Systems Technology *	15.0503		
Electrician	46.0302		
Construction Trades, Other	46.9999		
Construction Management	52.2001		
12.1 Correction Services		**104**	**-80**
Corrections and Criminal Justice	43.0199		
6.2 Business Financial Management		**79**	**-78**
Taxation	52.1601		
4.6 Administrative and Information Support		**181**	**-68**
Data Entry/Microcomputer Applications (General) *	11.0601		
Data Entry/Microcomputer Applications (Other) *	11.0699		
Administrative Assistant and Secretary Science	52.0401		
Business/Office Automation/Technology	52.0407		
General Office Occupations and Clerical Services	52.0408		
Business Operations Support and Secretarial Services	52.4099		
8.5 Biotechnology Research and Development		**70**	**-48**
Biotechnology *	26.1201		
Medicinal and Pharmaceutical Chemistry (MS, PhD) *	51.2004		
Pharmacy, Pharmaceutical Services and Admin. *	51.2099		
6.3 Banking and Related Services		**49**	**-43**
Banking and Financial Support Services	52.0803		
6.4 Insurance Services		**41**	**-41**
Insurance	52.1701		

Career Pathway	CIP	Average Openings 2008-18	Average Annual Graduate Deficit
8.4 Support Services		**117**	**- 41**
Foods, Nutrition, and Wellness Studies	19.0501		
Foodservice Systems Administration	19.0505		
Foods, Nutrition, and Related services	19.0599		
1.3 Animal Systems		**146**	**-32**
Animal Sciences, General *	01.0901		
4.4 Business Analysis		**214**	**-29**
Management Information Systems	52.1201		
Management Information Systems and Services	52.1299		
9.3 Travel and Tourism		**18**	**- 18**
Hospitality Administration/Management, General	52.0901		
Tourism and Travel Services Marketing Operations	52.1905		
11.2 Information Support and Services		**345**	**- 11**
Computer and Information Sciences. General *	11.0101		
Information Technology *	11.0103		
Computer and Information Sciences. Other *	11.0199		
Data Processing and Data Processing Technology *	11.0301		
Information Science/Studies *	11.0401		
Systems Administration/Administrator *	11.1001		
Computer Information Technology Services Admin. *	11.1099		
Computer and Information Sciences and Support *	11.9999		
7.4 Planning		**17**	**-10**
City/Urban, Community and Regional Planning	40.0301		
Urban Studies	45.1201		
8.1 Therapeutic Services			
Speech Language Pathology*	51.0202		
Dental Hygiene*	51.0602		
Pharmacy (PharmD)*	51.2001		
Nursing- Registered Nurse Training *	51.1601		
5.3 Teaching /Training Pathway			
Interdisciplinary Studies	30.9999		
Education, General	13.0101		
Bilingual and Multilingual Education	13.0201		
Special Education and Teaching, General	13.1001		
Education/Teaching of Specific Learning Disabilities	13.1011		
Education/Teaching of Speech or Language Disabilities	13.1012		
Early Childhood Education Special Ed. Programs	13.1015		
Special Education and Teaching, General	13.1099		
Elementary Education	13.1202		
Junior High/ Intermediate Middle School Education	13.1203		
Secondary Education and Teaching	13.1205		

Teacher Education	13.1206		
Kindergarten/Pre-School Education	13.1209		
Early Childhood Education	13.1210		
Agricultural Teacher Education	13.1301		
Art Teacher Education	13.1302		
Business Teacher Education	13.1303		
English/Language Arts Education	13.1305		
Foreign Language Education	13.1306		
Health Education	13.1307		
Family and Consumer Sciences Education	13.1308		
Technology Teacher Education/Industrial Arts	13.1309		
Mathematics Teacher Education	13.1311		
Music Teacher Education	13.1312		
Physical Education Teaching and Coaching	13.1314		
Reading Teacher Education	13.1315		
Science Teacher Education	13.1316		
Social Studies Teacher Education	13.1318		
Technical Teacher Education	13.1319		
Biology Teacher Education	13.1322		
Chemistry Teacher Education	13.1323		
Drama and Dance Teacher Education	13.1324		
History Teacher Education	13.1328		
Speech Teacher Education	13.1331		

*- Health/STEM CIP