



Academic Supply and Occupational Demand in Tennessee

Workforce Needs and Degree Production

Annual Report
January 15, 2019



Tennessee Higher Education Commission

Tennessee Higher Education Commission

2018-19 Commission Members

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Table of Contents

Executive Summary.....	4
Introduction	5
Data and Methods	6
Expected Degrees.....	8
State Workforce Needs.....	13
Institutions Offering Programs in High-Demand Occupations	18
Regional Workforce Needs	30
Limitations and Conclusions	33
Appendix A: Degree Production Tables.....	34
Appendix B: Program of Study Clusters.....	39
Appendix C: Institutions Included in Completion Data	40
Appendix D: Supply and Demand Reports for Tennessee’s 25 Highest-Demand Occupations	43
Appendix E: Occupations with High Employer Demand by Region.....	61



List of Tables

Table 1: Top 25 High-Demand Occupations with the Greatest Number of Annual Openings.....	15
Table 2: Employment Rates for the Programs of Study and Award Levels for the Top 25 Occupations.....	16
Table 3: Programs of Study with the Largest Projected Surplus	17
Table 4: Crosswalk of CERT Occupation Groups to TDLWD Occupations	31
Table A-1: Total Degrees by Degree Level	34
Table A-2: Certificates by Sector	35
Table A-3: Associate Degrees by Sector	36
Table A-4: Bachelor’s Degrees by Sector.....	37
Table A-5: Total Degrees by Sector	38
Table B-1: Program of Study Cluster Codes and Titles.....	39
Table C-1: Institutions Included in TDLWD’s Completion Data.....	40
Table E-1: Occupations with High Employer Demand by Region.....	61

List of Figures

Figure 1: Total Degrees by Degree Level.....	8
Figure 2: Certificates by Sector	9
Figure 3: Associate Degrees by Sector	10
Figure 4: Bachelor’s Degrees by Sector	11
Figure 5: Total Degrees by Sector	12
Figure 6: Map of TNECD Regions	30



Executive Summary

- Higher education institutions in Tennessee will award more postsecondary credentials by academic year 2025.
 - Tennessee is projected to award 79,299 degrees in 2025, compared to 71,143 in 2016, which represents an 11.5 percent increase in statewide degree production.
 - Total credential production in Tennessee is expected to increase across all sectors, except at proprietary institutions; a 6.1 percent decrease in this sector is projected from 2016 to 2025.
 - More associate and bachelor's degrees will be awarded, while slightly fewer certificates will be awarded. The most substantial growth will be in associate degrees, with a projected increase of 22.1 percent from 2016 to 2025.
 - Public universities will continue to award the largest share of total credentials. By 2025, community colleges are projected to surpass proprietary institutions to become the second largest producer of total credentials. This is an expected shift, given the increase in community college enrollment and decline in proprietary enrollment in recent years.
- There is high demand for individuals trained in a variety of occupations across the state.
 - The occupations with the greatest number of projected annual openings include General and Operations Managers, Registered Nurses, First-Line Supervisors of Production and Operating Workers, and Secondary School Teachers (except Special and Career/Technical Education).
 - Occupations with the greatest number of projected annual openings require all levels of education and training, from a high school diploma (or equivalent) through a graduate degree.
 - Conversely, a number of career paths are oversupplied; more Tennesseans are trained in the following occupations than there are jobs available: Drafting and Design Technology, Postsecondary Teachers (Teacher Education), Power Structural and Technical Systems Pathway, and Support Services (Instructional Coordinators).
- Many higher education institutions in Tennessee offer academic programs that can meet the workforce needs of high-demand occupations.
 - Public, private, and proprietary institutions offer programs of all levels in majors related to these high-demand occupations.
 - Opportunities for postsecondary training in these occupations are available across the state and are not limited to specific geographic areas.
- Occupational demand varies slightly by region but is largely aligned with statewide workforce needs.
 - Regional projections indicate that the following six occupation groups are in high demand: Information Technology, Production, Healthcare, Engineering and Engineering-Related, Business and Financial Operations, and Transportation and Material Moving.
 - Regional projections indicate that growth among STEM occupations is expected to outpace growth among all other occupations from 2017 to 2027; STEM occupations are expected to increase by 18 percent, while all other occupations are expected to increase by 12 percent.



Introduction

This report is prepared pursuant to Tennessee Code Annotated § 49-7-112(b), which directs the Tennessee Higher Education Commission (THEC) to “produce an annual report regarding state workforce need projections and credential production.”

This report is the result of a collaboration between THEC and the Tennessee Department of Labor and Workforce Development (TDLWD). Using data from academic years 2006 through 2016, THEC projected degree production for public, private, and proprietary¹ institutions in Tennessee through 2025 (i.e., academic supply). Separately, TDLWD projected the needs of Tennessee’s workforce (i.e., occupational demand) for 2016 through 2026 to determine which occupations will have the greatest number of annual openings. TDLWD then analyzed the credentials produced by Tennessee’s postsecondary institutions in the programs of study aligned with high-demand occupations to determine whether higher education is meeting the needs of employers.

This report is divided into five sections:

- **Expected Degrees** presents projections of postsecondary credentials to be awarded by public, private, and proprietary institutions in Tennessee through 2025.
- **State Workforce Needs** identifies the top 25 occupations with the highest number of annual openings in Tennessee through 2026. This section also lists the most oversupplied programs of study in Tennessee, for which there are substantially more postsecondary graduates than job opportunities.
- **Institutions Offering Programs in High-Demand Occupations** lists the public, private, and proprietary institutions across Tennessee that offer programs in the 25 highest-demand occupations.
- **Regional Workforce Needs** identifies occupations with high employer demand in each of the state’s nine Tennessee Department of Economic and Community Development (TNECD) regions.
- **Limitations and Conclusions** describes the caveats in these analyses and summarizes the key takeaways of the report.

¹ Proprietary institutions are also known as “for-profit” institutions.

Data and Methods

Projections of degree production and workforce demand were developed independently by THEC and TDLWD, respectively. The sections below explain the methodology used to develop these projections and address important caveats for using these estimates.

Academic Supply Projections

Postsecondary credentials are projected through academic year 2025, based on historical data for 2006 through 2016. The institutions included in these projections are public, private, and proprietary institutions in Tennessee that award postsecondary certificates, associate degrees, or bachelor's degrees.² For public and proprietary institutions, THEC used historical data from its student information system, its Division of Postsecondary State Authorization, and the Integrated Postsecondary Education Data System (IPEDS).³ For private institutions, THEC used historical data from the Tennessee Independent Colleges and Universities Association (TICUA) and IPEDS. The projections include certificates of less than two years in length, associate degrees, and bachelor's degrees. THEC's projections are aggregated at the degree level; degree production is not disaggregated by major or concentration.

Occupational Demand Projections

TDLWD projected occupational demand by Standard Occupation Classification (SOC) code. The Bureau of Labor Statistics provides information about the education and training required for specific occupations across the state. These education and training requirements reflect what is typically observed for an employee in a given occupation, though exceptions exist. Except where otherwise noted, any mention of "high-demand occupations" in this report refers to the 25 occupations with the greatest number of annual openings listed in **Table 1**.

One of the primary data sets used to identify workforce demand is Tennessee's long-term occupational projections (from 2016 to 2026), including expected annual total openings. The openings consist of those created by growth and by occupational separations. The criteria used for the 2019 report differ from those used previously because of changes in the Bureau of Labor Statistics' estimates of annual occupational separations, which now include robust measures of the numbers permanently exiting an occupation as well as those transferring out of an occupation. This has greatly increased the number of annual openings. For this reason, additional criteria including real-time labor market information from Tennessee's jobs database were used to present a more comprehensive picture of occupations in demand and their characteristics.

The average annual occupational projections are then compared to the number of people being trained in Tennessee in related programs of study to see if shortages of workers in certain occupations are expected (**Table 2**). It is important to note that the relationship between education requirements and

² Only certificates, associate degrees, and bachelor's degrees are included in the analysis to better align this report with Tennessee's Drive to 55 initiative, which set the goal of increasing Tennessee's educational attainment to 55 percent by 2025.

³ IPEDS is a federal dataset containing information about higher education institutions, including student demographics, program offerings, and completion data. Data are available at <https://nces.ed.gov/ipeds/>

occupation is most direct for highly specialized fields, such as those requiring a specific certificate or an advanced degree. Conversely, many fields requiring a bachelor's degree are less clearly defined, as those who hold a bachelor's degree often have diverse employment opportunities in a variety of fields.



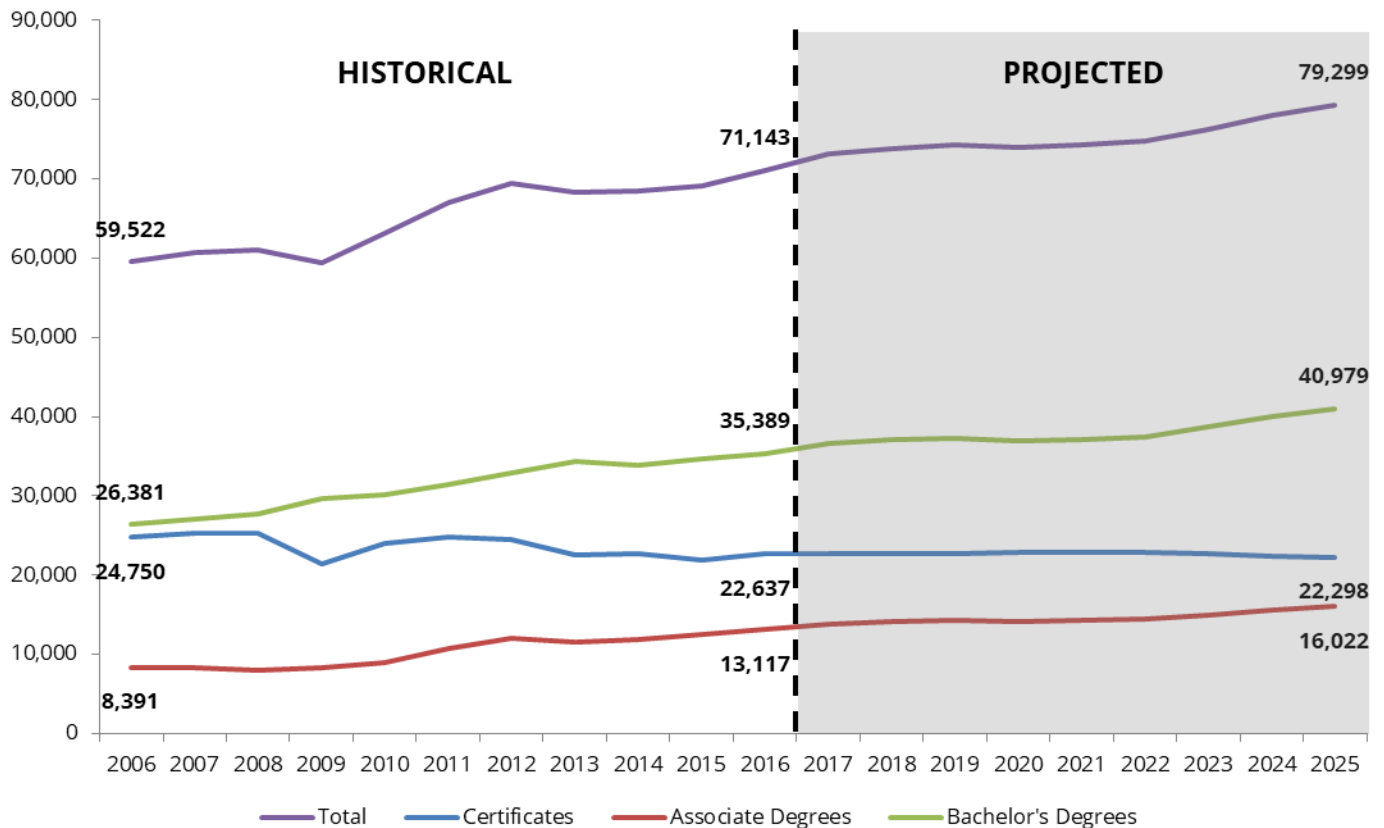
Expected Degrees

This section projects the supply of postsecondary credentials to be awarded by public, private, and proprietary institutions in Tennessee. These projections forecast various degree levels by institutional sector through academic year 2025. **Figures 1** through **5** below show historical degree production to the left of the dashed line and projected degree production in the shaded area to the right of the dashed line. The data table for each figure is available in **Appendix A**.

Total Degree by Degree Level

Figure 1 displays the projections of total degrees (disaggregated by degree level) to be awarded by public, private, and proprietary institutions in Tennessee. From 2016 to 2025, associate and bachelor's degrees are expected to increase (22.1 percent and 15.8 percent, respectively), while certificate production will decrease slightly (-1.5 percent). In 2025, Tennessee will produce 79,299 postsecondary credentials, an 11.5 percent increase from the 71,143 credentials produced in 2016. Although degree production is expected to increase substantially during the projection period, additional growth is needed to reach the Drive to 55.

Figure 1: Total Degrees by Degree Level



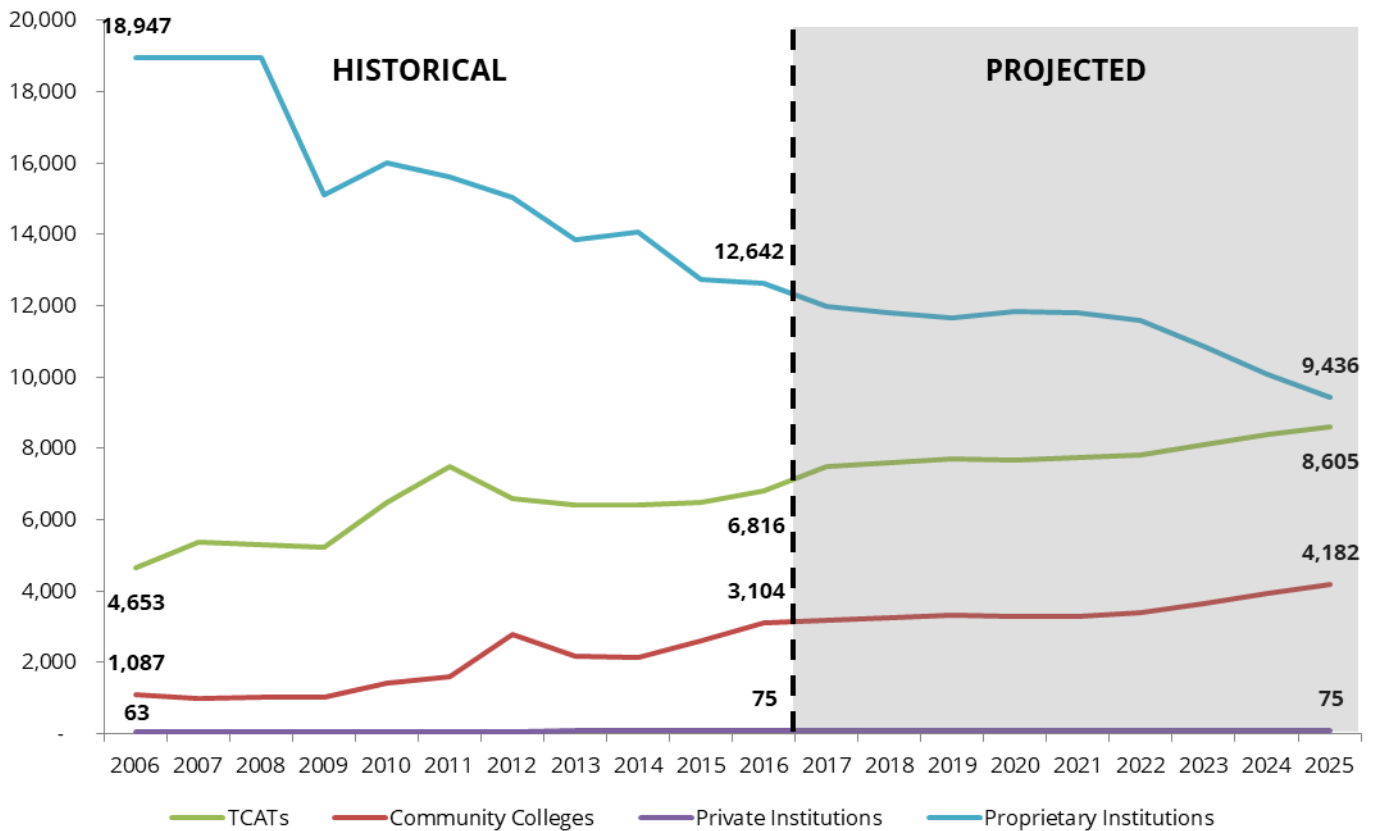
Source: THEC, 2017



Certificates

Figure 2 displays the projections of postsecondary certificates to be awarded by public, private, and proprietary institutions in Tennessee. From 2016 to 2025, certificate production at proprietary institutions is expected to decrease substantially (-25.4 percent). This decline is largely attributable to changes in regulations related to access to federal financial aid, which has resulted in the closure of several for-profit chains in recent years (e.g., Corinthian Colleges and ITT Technical Institute). Meanwhile, certificate production at TCATs and community colleges will continue to increase (26.2 percent and 34.7 percent, respectively). Certificate production at private institutions is projected to remain stable through 2025.

Figure 2: Certificates by Sector



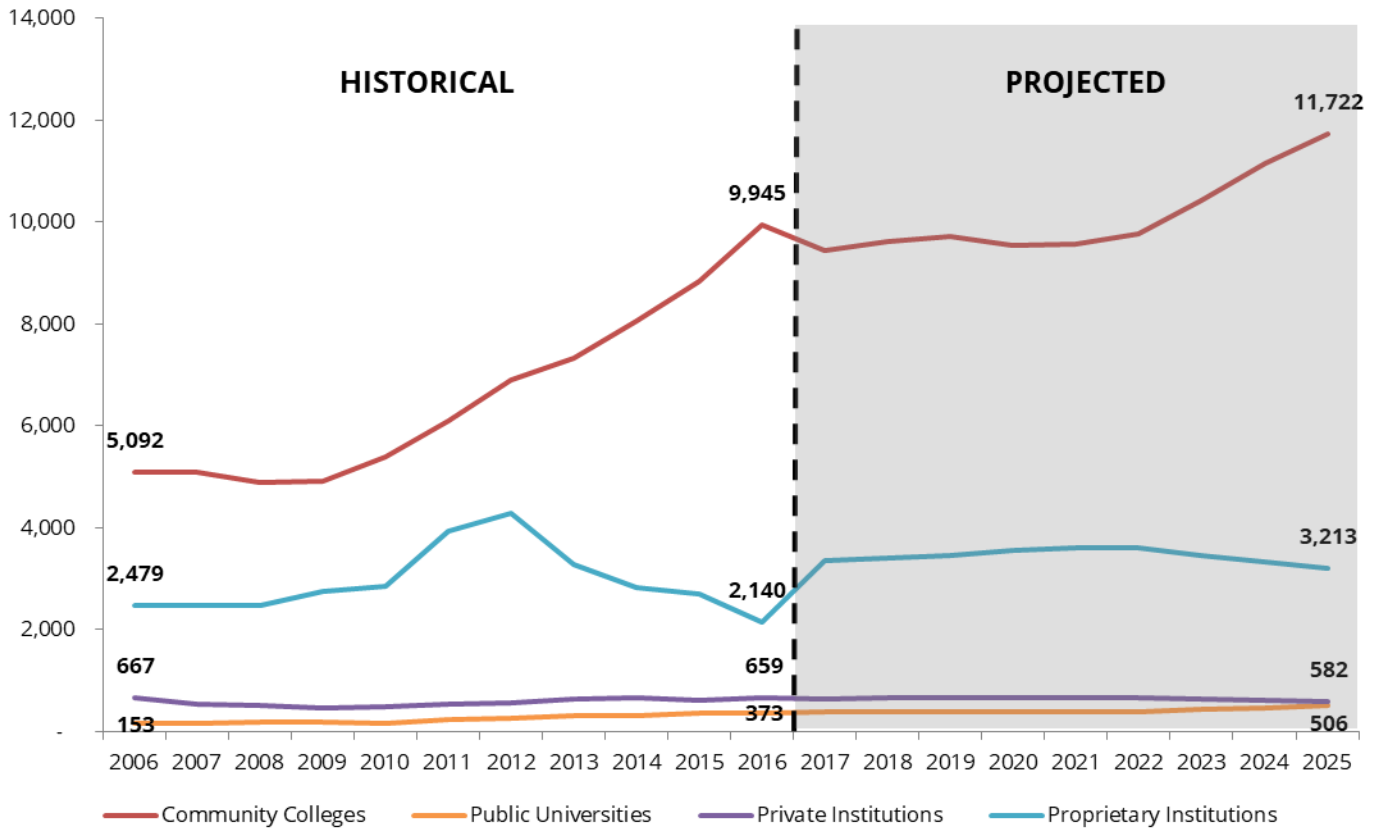
Source: THEC, 2017



Associate Degrees

Figure 3 displays the projections of associate degrees to be awarded by public, private, and proprietary institutions in Tennessee. From 2016 to 2025, associate degree production at community colleges is expected to increase considerably (17.9 percent or 1,777 degrees). Compared to community colleges, associate degree production at public universities, private institutions, and proprietary institutions is low, in absolute numbers. From 2016 to 2025, associate degree production is projected to increase from 373 to 506 at public universities⁴ and from 2,140 to 3,213 at proprietary institutions. Associate degree production at private institutions is projected to decrease by 11.7 percent, a loss of 77 degrees.

Figure 3: Associate Degrees by Sector



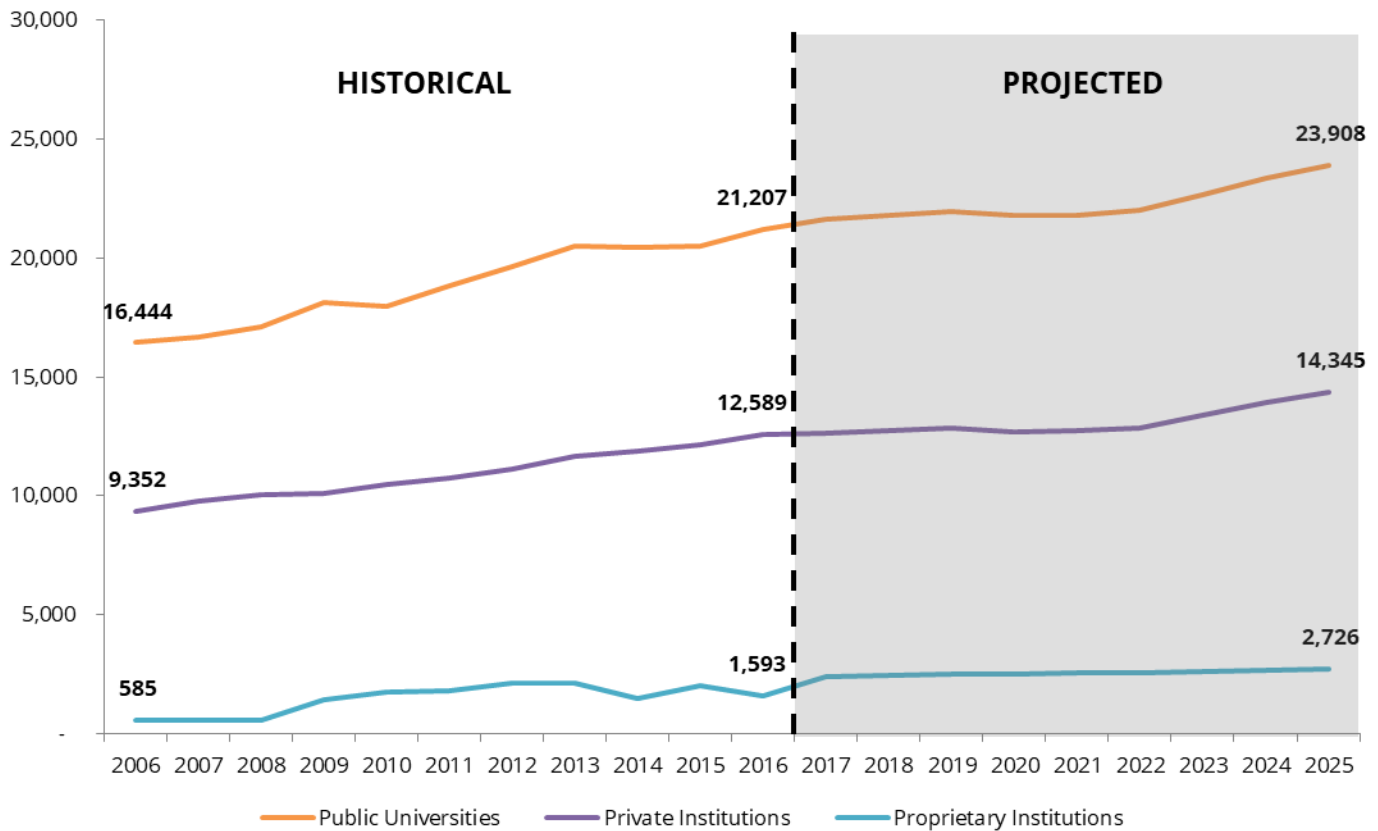
Source: THEC, 2017

⁴ Associate degree production at public universities is low because only two public universities (Austin Peay State University and Tennessee State University) offered associate degrees from 2006 to 2016.

Bachelor's Degrees

Figure 4 displays the projections of bachelor's degrees to be awarded by public, private, and proprietary institutions in Tennessee. From 2016 to 2025, bachelor's degree production is expected to increase across all sectors. Proprietary institutions will see the largest percent increase (71.1 percent), followed by private institutions (13.9 percent) and public universities (12.7 percent). This is largely due to the relative share of bachelor's degree production in each sector. In absolute numbers, public universities will see the most growth, with a projected increase of 2,701 bachelor's degrees from 2016 to 2025. Proprietary institutions, on the other hand, will see the least growth, with a projected increase of 1,133 bachelor's degrees from 2016 to 2025.

Figure 4: Bachelor's Degrees by Sector



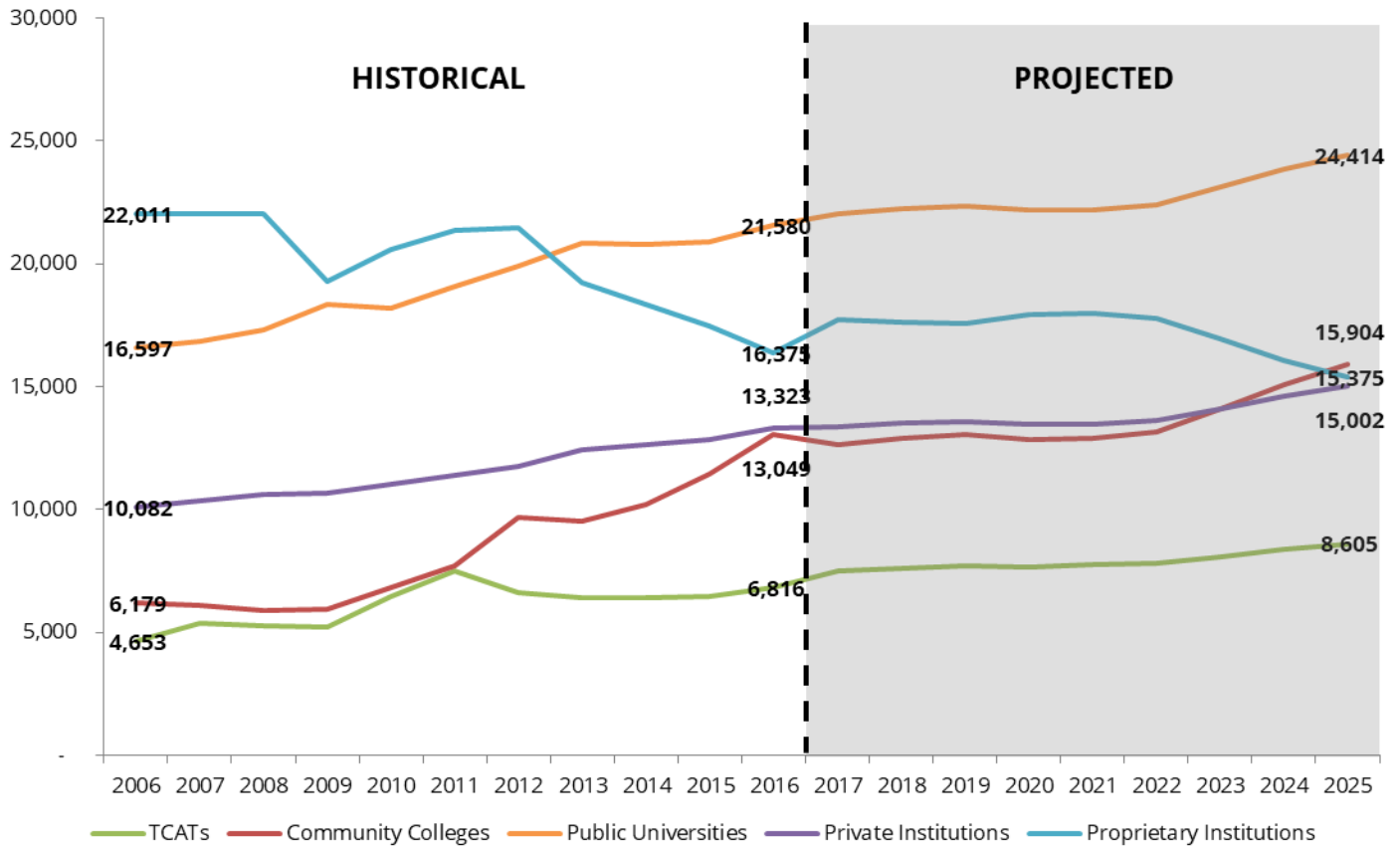
Source: THEC, 2017



Total Degrees by Sector

Figure 5 displays the projections of total degrees (disaggregated by sector) to be awarded by public, private, and proprietary institutions in the state. From 2016 to 2025, total degree production is expected to increase across all sectors except for proprietary institutions. In terms of percent increase, the largest growth in degree production from 2016 to 2025 will be at TCATs, with an increase of 26.2 percent, followed by community colleges, with an increase of 21.9 percent. In absolute numbers, the largest growth in degree production from 2016 to 2025 will be at community colleges, with an increase of 2,855 degrees, followed by public universities, with an increase of 2,834 degrees.

Figure 5: Total Degrees by Sector



Source: THEC, 2017



State Workforce Needs

While Tennessee's higher education system is robust, workforce growth has outpaced degree production in many occupations. TDLWD's Workforce Insights, Research and Reporting Engine Division (WIR²ED) prepares information annually on top occupations and programs of study with expected workforce demand. A variety of indicators are used to identify the top occupations and programs.

Table 1 lists the 25 highest-demand occupations expected to have the greatest number of annual openings from 2016 to 2026, by SOC code and occupation title. **Table 2** provides the corresponding program of study code for each occupation.⁵ The occupations span most of the 16 major programs of study, from architecture and construction to business, information technology, manufacturing, and science, technology, engineering, and mathematics (STEM).⁶ The criteria used to select these occupations include the following:

- The occupation is within a program of study with an expected positive growth rate from 2016 to 2026;
- The occupation is within a program of study with number of awards in 2016-2017 no more than 1.5 times the number of annual average openings;
- The occupation has more than 150 annual total openings; and
- The occupation has an entry-level annual wage of \$28,000 or more.

Table 1 provides the SOC Code and Occupation Title for each high-demand occupation. Level of Education lists the most common educational requirement for the occupations listed, and Annual Openings provides TDLWD's projected annual job openings from 2016 through 2026 (accounting for industry growth and occupational separations). New this year, real-time labor market information was collected from the extensive jobs database on jobs4tn.gov from October 24 through October 26, 2018, including a ratio of the number of current candidates with active resumes on the system compared to the current number of job postings on the system (Candidates per Opening). A ratio of 1.0 or less indicates there was a shortage of candidates on the system at that point in time compared to the number of jobs available. If the ratio was 1.0 or less, and the occupation met the criteria listed above, the occupation was included. Finally, Entry Annual Wage 2017 provides the entry-level annual wages for individuals working in that occupation.

Table 2 provides employment rates for the programs of study that correspond with the top 25 occupations in demand.⁷ Data available this year include the Number of Awards (concentrators, certificates, and degrees) in each program of study by level of education.⁸ New this year is the number of individuals employed in Tennessee in an occupation related to their program of study within six months of receiving an award, excluding individuals who enrolled at another educational institution in the next

⁵ A program of study is a grouping of similar academic programs. These groupings are derived from a combination of Classification of Instructional Program (CIP) code and level of education (associate degree, bachelor's degree, etc.).

⁶ A list of all 16 programs of study clusters is available in **Appendix B**.

⁷ Program of study codes and SOC codes are not a one to one match. There are many SOC codes associated with each program of study, so SOC codes that describe similar occupations may share the same program of study code.

⁸ The number of completers in **Table 2** includes students who completed a program at 100 public, private, and proprietary institutions across the state. The full list of institutions issuing awards is available in **Appendix C**.

semester (Number Employed). Programs of study were included if Percent Employed was 60 percent or greater.

Table 1 includes a wide variety of occupations for which available evidence indicates there is high workforce demand. TDLWD's Supply and Demand Reports for the corresponding programs of study are available in **Appendix D**.⁹ These reports contain detailed information about the program of study, including projected demand (through 2026) for each SOC code, number of awards earned (in 2016) for each CIP code, and the resulting supply/demand ratio.

Tennessee also has a number of programs that are oversupplied in the workforce. **Table 3** presents the programs that graduate a larger number of students than there are jobs available, leading to a surplus of individuals trained in these occupations. These programs of study include diverse occupations such as Drafting and Design Technology, Postsecondary Teachers (Teacher Education), Actuarial Science, Chemical Engineering, and Exercise Physiology.

⁹ The total awards in **Table 2** and **Appendix D** will not match precisely because they come from different data sources. The awards data in **Table 2** come from P20 Connect (Tennessee's longitudinal data system) so that postsecondary completers can be matched with employment records. The awards data in **Appendix D** come from IPEDS, which provides a more comprehensive view of completers at all public, private, and proprietary institutions that are eligible for Title IV federal financial aid.

Table 1: Top 25 High-Demand Occupations with the Greatest Number of Annual Openings

SOC Code	Occupation Title	Level of Education	Annual Openings	Candidates per Opening	Entry Annual Wage 2017
11-1021	General and Operations Managers	Bachelor's	4,740	0.47	\$45,280
29-1141	Registered Nurses	Bachelor's	4,315	0.05	\$45,440
51-1011	First-Line Supervisors of Production and Operating Workers	High school diploma	1,805	0.73	\$35,140
25-2031	Secondary School Teachers, Except Special and Career/Technical Education	Bachelor's	1,495	0.39	\$39,540
15-1151	Computer User Support Specialists*	Some college	1,160	0.80	\$32,020
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	High school diploma	1,110	0.90	\$40,980
13-1161	Market Research Analysts and Marketing Specialists	Bachelor's	1,100	0.61	\$34,150
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products*	Bachelor's	1,070	0.70	\$39,120
11-9111	Medical and Health Services Managers	Bachelor's	1,060	0.69	\$60,520
11-2022	Sales Managers*	Bachelor's	1,030	0.60	\$55,010
33-3051	Police and Sheriff's Patrol Officers	High school diploma	960	0.80	\$31,030
25-2022	Middle School Teachers, Except Special and Career/Technical Education	Bachelor's	820	0.19	\$40,180
15-1132	Software Developers, Applications	Bachelor's	820	0.33	\$55,660
15-1121	Computer Systems Analysts	Bachelor's	720	0.39	\$46,860
29-2012	Medical and Clinical Laboratory Technicians	Associate	620	0.93	N/A
49-9043	Maintenance Workers, Machinery	High school diploma	590	0.58	\$30,550
17-2051	Civil Engineers	Bachelor's	570	0.24	\$59,790
11-1011	Chief Executives	Bachelor's	570	0.54	\$43,790
11-9033	Education Administrators, Postsecondary	Master's	535	1.00	\$49,630
31-2021	Physical Therapist Assistants	Associate	475	0.09	\$43,740
15-1142	Network and Computer Systems Administrators	Bachelor's	455	0.85	\$50,250
15-1133	Software Developers, Systems Software	Bachelor's	450	0.30	\$62,050
21-1022	Healthcare Social Workers	Master's	415	0.27	\$35,290
13-1051	Cost Estimators	Bachelor's	390	0.37	\$40,370
11-3071	Transportation, Storage, and Distribution Managers*	High school diploma	380	0.82	\$47,930

*Awards and matching employment data available at one level above or below the level of education listed.

Sources: Columns 1-4, TN Employment Projections 2016-2026, TDLWD; Column 5, Jobs4tn.gov; Column 6, TN Occupational Employment Survey, TDLWD

Table 2: Employment Rates for the Programs of Study and Award Levels for the Top 25 Occupations

SOC Code (from Table 1)	Program of Study Code	Program of Study Title	Number of Awards	Number Employed	Percent Employed
11-1021	04.1000000	Business Management	2,834	1,786	63.0%
29-1141	08.1110000	Nursing (RN)	2,087	1,569	75.2%
51-1011	13.1000000	Precision Production Pathway	61	38	62.3%
25-2031	05.1180000	Middle, Secondary and Vocational Education Teachers	1,216	888	73.0%
15-1151	11.3400000	Web/Multimedia Management, Programming*	223	164	73.5%
49-1011	13.2200000	Prod. Design, Ops, and Maint. Path -- Operations & Maint.	6	4	66.7%
13-1161	14.1000000	Marketing Management and Research	584	372	63.7%
41-4011	14.2000000	Selling and Sales Management*	12	9	75.0%
11-9111	04.1000000	Business Management	2,834	1,786	63.0%
11-2022	14.2000000	Selling and Sales Management*	12	9	75.0%
33-3051	12.4130000	Law Enforcement	172	109	63.4%
25-2022	05.1180000	Middle, Secondary and Vocational Education Teachers	1,216	888	73.0%
15-1132	11.3400000	Web/Multimedia Management, Programming	672	407	60.6%
15-1121	11.3400000	Web/Multimedia Management, Programming	672	407	60.6%
29-2012	08.2220000	Medical and Clinical Laboratory Technicians	29	26	89.7%
49-9043	13.2200000	Prod. Design, Ops, and Maint. Path -- Operations & Maint.	6	4	66.7%
17-2051	15.1130000	Civil Engineering	146	89	61.0%
11-1011	04.1000000	Business Management	2,834	1,786	63.0%
11-9033	05.1110000	Educational Administration	253	223	88.1%
31-2021	08.1130000	Physical Therapy Assistant	123	100	81.3%
15-1142	11.1000000	Network Systems	3	2	66.7%
15-1133	11.3400000	Web/Multimedia Management, Programming	672	407	60.6%
21-1022	10.3110000	Social Work	465	285	61.3%
13-1051	02.1220000	Technical Design & Preconstruction	27	21	77.8%
11-3071	07.7160000	Public and Nonprofit Management and Administration*	8	6	75.0%

*Awards and matching employment data available at one level above or below the level of education listed in **Table 1**.

Sources: Column 1, TN Employment Projections 2016-2026, TDLWD; Column 2, TDLWD WID; Columns 3-6, Boyd Center, University of Tennessee, Knoxville



Table 3:Programs of Study with the Largest Projected Surplus

Program of Study Code	Program of Study Title	Expected Annual Openings	Number of Completers	Projected Surplus	Completers per Annual Opening
15.1260000	Drafting and Design Technology	330	1,192	862	3.61
05.1230000	Postsecondary Teachers-Teacher Education	125	759	634	6.07
01.4000000	Power Structural and Technical Systems Pathway	80	644	564	8.05
05.1150000	Support Services- Instructional Coordinators	225	784	559	3.48
05.1130000	Support Services- Interpreters/Translators	95	494	399	5.20
15.3170000	Mathematics, Actuarial Science	190	570	380	3.00
08.4140000	Dietitian Assistance	65	380	315	5.85
11.3100000	Interactive Media	25	276	251	11.04
15.1120000	Chemical Engineering	50	298	248	5.96
15.1220000	Biomedical Engineering	25	161	136	6.44
08.1360000	Radiation Therapy	35	169	134	4.83
08.1410000	Exercise Physiology	20	109	89	5.45
08.1280000	Optometry	35	124	89	3.54

Source: TDLWD, Projections from 2016 to 2026



Institutions Offering Programs in High-Demand Occupations

The following section presents the academic programs available at public, private, and proprietary postsecondary institutions in Tennessee that produce graduates who are employable in each high-demand program of study¹⁰ (corresponding to the program of study codes in **Table 2**).¹¹ Each table includes the institution name, the system to which the institution belongs,¹² the grand division in which the institution is located, and the degree level offered by the institution (certificate, associate degree, bachelor's degree, graduate certificate, or graduate degree).

Business Management

Careers in this program of study include general managers, medical managers, real estate managers, and administrative services managers. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Baptist Memorial College of Health Sciences	TICUA	West
Belmont University	TICUA	Middle
Bethel University	TICUA	West
Bryan College-Dayton	TICUA	East
Carson-Newman University	TICUA	East
Christian Brothers University	TICUA	West
Cumberland University	TICUA	Middle
Daymar College-Clarksville	Proprietary	Middle
Daymar College-Nashville	Proprietary	Middle
DeVry University-Tennessee	Proprietary	Middle
East Tennessee State University	LGI	East
Fisk University	TICUA	Middle
Freed-Hardeman University	TICUA	West
Johnson University	TICUA	East
King University	TICUA	East
Lane College	TICUA	West
Le Moyne-Owen College	TICUA	West
Lee University	TICUA	East
Lincoln Memorial University	TICUA	East
Lipscomb University	TICUA	Middle

¹⁰ These programs were identified by TDLWD as providing the necessary award to enter a respective field. Additional institutions and programs may exist that prepare students to enter a respective field of work.

¹¹ Some of the closely-related occupations share the same program of study code, so there are only 17 programs of study detailed in this section. These 17 programs of study encompass all 25 high-demand occupations.

¹² Institutions are identified as part of the Tennessee Board of Regents (TBR), University of Tennessee (UT), or TICUA or are listed as Private, non-profit or Proprietary (for-profit). Public four-year institutions that were formerly governed by TBR are now identified as locally governed institutions (LGIs).

Institution Name	System	Grand Division
Martin Methodist College	TICUA	Middle
Maryville College	TICUA	East
Middle Tennessee State University	LGI	Middle
Milligan College	TICUA	East
Rhodes College	TICUA	West
South College	Proprietary	East
Southern Adventist University	TICUA	East
Strayer University-Tennessee	Proprietary	West
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
Tennessee Wesleyan University	TICUA	East
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Tusculum College	TICUA	East
Union University	TICUA	West
University of Memphis	LGI	West
University of Phoenix-Tennessee	Proprietary	Middle
Visible Music College	Private, non-profit	West
Welch College	TICUA	Middle

Nursing (RN)

Careers in this program of study include registered nurses, nurse midwives, and nursing instructors. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Baptist Memorial College of Health Sciences	TICUA	West
Belmont University	TICUA	Middle
Bethel University	TICUA	West
Carson-Newman University	TICUA	East
Cumberland University	TICUA	Middle
East Tennessee State University	LGI	East
Freed-Hardeman University	TICUA	West
King University	TICUA	East
Lee University	TICUA	East
Lincoln Memorial University	TICUA	East
Lipscomb University	TICUA	Middle
Martin Methodist College	TICUA	Middle

Institution Name	System	Grand Division
Middle Tennessee State University	LGI	Middle
Milligan College	TICUA	East
South College	Proprietary	East
Southern Adventist University	TICUA	East
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
Tennessee Wesleyan University	TICUA	East
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Health Science Center	UT	West
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Tusculum College	TICUA	East
Union University	TICUA	West
University of Memphis	LGI	West

Precision Production Pathway

Careers in this program of study include machinists, team assemblers, machine setters and operators, and tool and die makers. The typical education requirement is a high school diploma or equivalent. Postsecondary certificates in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Northeast State Community College	TBR	East
TCAT Athens	TBR	East
TCAT Covington	TBR	West
TCAT Crossville	TBR	East
TCAT Crump	TBR	West
TCAT Dickson	TBR	Middle
TCAT Harriman	TBR	East
TCAT Hartsville	TBR	Middle
TCAT Hohenwald	TBR	Middle
TCAT Jacksboro	TBR	East
TCAT Jackson	TBR	West
TCAT Knoxville	TBR	East
TCAT Livingston	TBR	Middle
TCAT McKenzie	TBR	West
TCAT McMinnville	TBR	Middle
TCAT Memphis	TBR	West
TCAT Morristown	TBR	East
TCAT Murfreesboro	TBR	Middle

Institution Name	System	Grand Division
TCAT Nashville	TBR	Middle
TCAT Newbern	TBR	West
TCAT Oneida-Huntsville	TBR	East
TCAT Paris	TBR	West
TCAT Pulaski	TBR	Middle
TCAT Shelbyville	TBR	Middle
TCAT Whiteville	TBR	West
William Moore College of Technology	Private, non-profit	West

Middle, Secondary and Vocational Education Teachers

Careers in this program of study include secondary school teachers, middle school teachers, and career and technical education teachers. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Belmont University	TICUA	Middle
Bethel University	TICUA	West
Bryan College-Dayton	TICUA	East
Carson-Newman University	TICUA	East
Cumberland University	TICUA	Middle
East Tennessee State University	LGI	East
Freed-Hardeman University	TICUA	West
Johnson University	TICUA	East
King University	TICUA	East
Lane College	TICUA	West
Lee University	TICUA	East
Lipscomb University	TICUA	Middle
Martin Methodist College	TICUA	Middle
Maryville College	TICUA	East
Middle Tennessee State University	LGI	Middle
Southern Adventist University	TICUA	East
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
Tennessee Wesleyan University	TICUA	East
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Tusculum College	TICUA	East
Union University	TICUA	West
University of Memphis	LGI	West

Institution Name	System	Grand Division
Vanderbilt University	TICUA	Middle
Welch College	TICUA	Middle

Web/Multimedia Management, Programming

Careers in this program of study include computer support specialists, computer systems analysts, software developers, and computer and information systems managers. The typical education requirement is some college or a bachelor's degree. Associate degrees and/or bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Belmont University	TICUA	Middle
Bethel University	TICUA	West
Carson-Newman University	TICUA	East
Chattanooga State Community College	TBR	East
Christian Brothers University	TICUA	West
Cleveland State Community College	TBR	East
Columbia State Community College	TBR	Middle
Daymar College-Clarksville	Proprietary	Middle
DeVry University-Tennessee	Proprietary	Middle
Dyersburg State Community College	TBR	West
East Tennessee State University	LGI	East
Fisk University	TICUA	Middle
Freed-Hardeman University	TICUA	West
Jackson State Community College	TBR	West
King University	TICUA	East
Lane College	TICUA	West
Le Moyne-Owen College	TICUA	West
Lee University	TICUA	East
Lipscomb University	TICUA	Middle
Martin Methodist College	TICUA	Middle
Maryville College	TICUA	East
Middle Tennessee State University	LGI	Middle
Milligan College	TICUA	East
Nashville State Community College	TBR	Middle
National College-Nashville	Proprietary	Middle
Northeast State Community College	TBR	East
Pellissippi State Community College	TBR	East
Rhodes College	TICUA	West
Roane State Community College	TBR	East
Sewanee-The University of the South	TICUA	Middle
Southern Adventist University	TICUA	East

Institution Name	System	Grand Division
Southwest Tennessee Community College	TBR	West
Strayer University-Tennessee	Proprietary	West
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Union University	TICUA	West
University of Memphis	LGI	West
University of Phoenix-Tennessee	Proprietary	Middle
Vanderbilt University	TICUA	Middle
Volunteer State Community College	TBR	Middle
Walters State Community College	TBR	East

Production, Design, Operations, and Maintenance Path – Operations & Maintenance

Careers in this program of study include maintenance and repair workers, inspectors, mechanics, and purchasing agents. The typical education requirement is a high school diploma or equivalent. Postsecondary certificates in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Chattanooga State Community College	TBR	East
Cleveland State Community College	TBR	East
Columbia State Community College	TBR	Middle
Dyersburg State Community College	TBR	West
Motlow State Community College	TBR	Middle
Nashville State Community College	TBR	Middle
Pellissippi State Community College	TBR	East
Roane State Community College	TBR	East
Southwest Tennessee Community College	TBR	West
TCAT Athens	TBR	East
TCAT Covington	TBR	West
TCAT Crossville	TBR	East
TCAT Crump	TBR	West
TCAT Dickson	TBR	Middle
TCAT Elizabethton	TBR	East
TCAT Harriman	TBR	East
TCAT Hartsville	TBR	Middle
TCAT Hohenwald	TBR	Middle
TCAT Jackson	TBR	West
TCAT Knoxville	TBR	East
TCAT Livingston	TBR	Middle

Institution Name	System	Grand Division
TCAT McKenzie	TBR	West
TCAT McMinnville	TBR	Middle
TCAT Memphis	TBR	West
TCAT Morristown	TBR	East
TCAT Murfreesboro	TBR	Middle
TCAT Newbern	TBR	West
TCAT Paris	TBR	West
TCAT Pulaski	TBR	Middle
TCAT Ripley	TBR	West
TCAT Shelbyville	TBR	Middle
TCAT Whiteville	TBR	West

Marketing Management and Research

Careers in this program of study include market research analysts, marketing managers, and advertising and promotion managers. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Belmont University	TICUA	Middle
Carson-Newman University	TICUA	East
Christian Brothers University	TICUA	West
Cumberland University	TICUA	Middle
East Tennessee State University	LGI	East
Freed-Hardeman University	TICUA	West
Lee University	TICUA	East
Lincoln Memorial University	TICUA	East
Lipscomb University	TICUA	Middle
Maryville College	TICUA	East
Middle Tennessee State University	LGI	Middle
South College	Proprietary	East
Southern Adventist University	TICUA	East
Tennessee Technological University	LGI	Middle
Tennessee Wesleyan University	TICUA	East
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Union University	TICUA	West
University of Memphis	LGI	West
University of Phoenix-Tennessee	Proprietary	Middle



Selling and Sales Management

Careers in this program of study include sales representatives, sales managers, real estate agents, and advertising agents. The typical education requirement is a bachelor's degree. Bachelor's degrees and/or graduate degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
East Tennessee State University	LGI	East
Southern Adventist University	TICUA	East

Law Enforcement

Careers in this program of study include police officers, emergency dispatchers, detectives, and criminal investigators. The typical education requirement is a high school diploma or equivalent. Postsecondary certificates in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Cleveland State Community College	TBR	East
Daymar College-Clarksville	Proprietary	Middle
Daymar College-Murfreesboro	Proprietary	Middle
Dyersburg State Community College	TBR	West
Nashville State Community College	TBR	Middle
Volunteer State Community College	TBR	Middle
Walters State Community College	TBR	East

Medical and Clinical Laboratory Technicians

The typical education requirement for medical and clinical laboratory technicians is an associate degree. Associate degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Concorde Career College-Memphis	Proprietary	West
Fortis Institute-Cookeville	Proprietary	Middle
Fortis Institute-Nashville	Proprietary	Middle
Jackson State Community College	TBR	West
South College	Proprietary	East
Southwest Tennessee Community College	TBR	West
Volunteer State Community College	TBR	Middle



Civil Engineering

The typical education requirement for civil engineers is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Christian Brothers University	TICUA	West
Lipscomb University	TICUA	Middle
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East
University of Memphis	LGI	West
Vanderbilt University	TICUA	Middle

Educational Administration

Careers in this program of study include administrators at all levels of education, from preschool through postsecondary. The typical education requirement is a graduate degree. Graduate degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Carson-Newman University	TICUA	East
Christian Brothers University	TICUA	West
Cumberland University	TICUA	Middle
East Tennessee State University	LGI	East
Freed-Hardeman University	TICUA	West
Lee University	TICUA	East
Lincoln Memorial University	TICUA	East
Lipscomb University	TICUA	Middle
Middle Tennessee State University	LGI	Middle
Strayer University-Tennessee	Proprietary	West
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Union University	TICUA	West
University of Memphis	LGI	West
Vanderbilt University	TICUA	Middle



Physical Therapy Assistant

The typical education requirement for physical therapy assistants is an associate degree. Associate degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Chattanooga State Community College	TBR	East
Concorde Career College-Memphis	Proprietary	West
Daymar College-Clarksville	Proprietary	Middle
Jackson State Community College	TBR	West
Roane State Community College	TBR	East
South College	Proprietary	East
Southern Adventist University	TICUA	East
Southwest Tennessee Community College	TBR	West
Volunteer State Community College	TBR	Middle
Walters State Community College	TBR	East

Network Systems

Careers in this program of study include network and computer systems administrators, computer network support specialists, web developers, and information security analysts. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Lipscomb University	TICUA	Middle
University of Phoenix-Tennessee	Proprietary	Middle

Social Work

Careers in this program of study include school social workers, healthcare social workers, probation officers, and mental health and substance abuse social workers. The typical education requirement is a bachelor's or graduate degree. Bachelor's degrees and/or graduate degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
East Tennessee State University	LGI	East
Johnson University	TICUA	East
Lipscomb University	TICUA	Middle
Middle Tennessee State University	LGI	Middle
Oxford Graduate School	Private, non-profit	East
Southern Adventist University	TICUA	East
Tennessee State University	LGI	Middle

Institution Name	System	Grand Division
The University of Tennessee-Knoxville	UT	East
Trevecca Nazarene University	TICUA	Middle
Union University	TICUA	West
University of Memphis	LGI	West

Technical Design and Preconstruction

Careers in this program of study include construction managers and cost estimators. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Middle Tennessee State University	LGI	Middle

Public and Nonprofit Management and Administration

Careers in this program of study include social and community service managers, legislators, and fundraising managers. The typical education requirement is a bachelor's degree. Bachelor's degrees in this program of study are available at the following institutions:

Institution Name	System	Grand Division
Austin Peay State University	LGI	Middle
Belmont University	TICUA	Middle
Bethel University	TICUA	West
Bryan College-Dayton	TICUA	East
Carson-Newman University	TICUA	East
East Tennessee State University	LGI	East
Fisk University	TICUA	Middle
Freed-Hardeman University	TICUA	West
Johnson University	TICUA	East
King University	TICUA	East
Lee University	TICUA	East
Lincoln Memorial University	TICUA	East
Lipscomb University	TICUA	Middle
Maryville College	TICUA	East
Middle Tennessee State University	LGI	Middle
Milligan College	TICUA	East
Rhodes College	TICUA	West
Sewanee-The University of the South	TICUA	Middle
Tennessee State University	LGI	Middle
Tennessee Technological University	LGI	Middle
The University of Tennessee-Chattanooga	UT	East
The University of Tennessee-Knoxville	UT	East

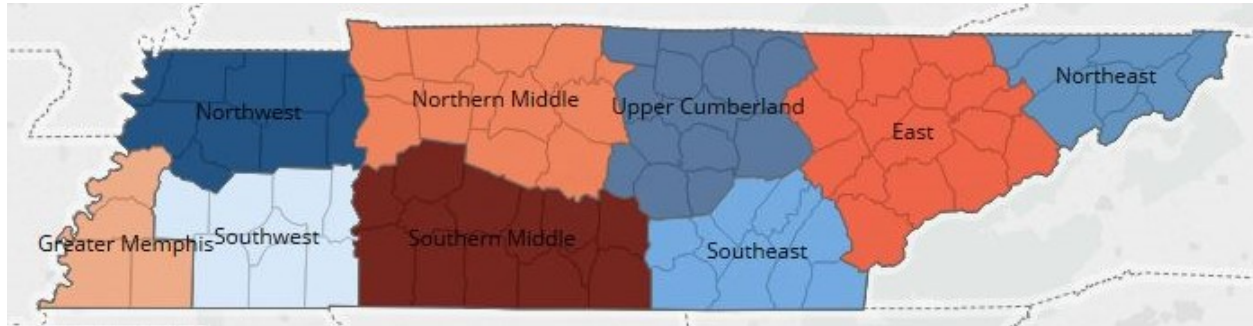
Institution Name	System	Grand Division
The University of Tennessee-Martin	UT	West
Trevecca Nazarene University	TICUA	Middle
Tusculum College	TICUA	East
Union University	TICUA	West
University of Memphis	LGI	West
Vanderbilt University	TICUA	Middle
Williamson Christian College	Private, non-profit	Middle



Regional Workforce Needs

TNECD's Center for Economic Research in Tennessee (CERT) recently conducted an occupational analysis to determine workforce needs across the state's nine TNECD regions (shown in **Figure 6**).¹³ This analysis identified 259 occupations with high employer demand based on job postings, hires, and projected job openings relative to total employment in the region. The methodology is detailed in the following section, and **Appendix E** lists all 259 occupations with high employer demand in one or more Tennessee regions.¹⁴

Figure 6: Map of TNECD Regions



Source: TNECD, LEAP Report Dashboard

Methodology

To identify occupations with high employer demand, CERT analyzed job postings, hires, and job openings for each occupation compared to total employment in the occupation. Based on the most recent data, occupations that meet at least two of the following requirements are considered to have high employer demand:

1. The ratio of 2017 job postings to the number of individuals employed in an occupation is greater than or equal to the median ratio for all occupations in the region;
2. The ratio of 2017 hires to the number of individuals employed in an occupation is greater than or equal to the median ratio for all occupations in the region; and/or
3. The ratio of projected annual job openings (averaged over 2017 to 2022) to the number of individuals employed in an occupation is greater than or equal to the median ratio for all occupations in the region.¹⁵

To encourage job creation and skill development in high-quality occupations, CERT set a minimum wage threshold for jobs included in the analysis; all high-demand occupations identified have a median wage that is at least 75 percent of the median wage for the region. Occupations employing less than 0.04 percent of the region's total number of employed individuals are excluded.

¹³ The full version of CERT's 2018 LEAP Report is available at <http://www.tnecd.com/research-and-data/publications/>

¹⁴ With the 2018 LEAP Report, CERT also released an interactive dashboard, available at <https://www.tn.gov/transparenttn/jobs-economic-development/openecd/tnecd-performance-metrics/workforce/leap-report.html>

Occupation Groups with High Employer Demand

CERT's 2018 LEAP Report highlights six occupation groups with high employer demand across the state:

1. Information Technology
2. Production
3. Healthcare
4. Engineering and Engineering-Related
5. Business and Financial Operations
6. Transportation and Material Moving

Though the definition of “high-demand” differs, these occupation groups are aligned with the high-demand programs of study identified by TDLWD. **Table 4** provides a crosswalk of CERT’s six high-demand occupation groups to TDLWD’s program of study clusters and high-demand occupations. Additional information about CERT’s high-demand occupation groups, including regional demand for specific occupations, is available in CERT’s full report.

Table 4: Crosswalk of CERT Occupation Groups to TDLWD Occupations

CERT High-Demand Occupation Group	TDLWD Program of Study Cluster	TDLWD High-Demand Occupation
Information Technology	Information Technology	Computer User Support Specialists
		Software Developers, Applications
		Computer Systems Analysts
		Network and Computer Systems Administrators
		Software Developers, Systems Software
Production	Manufacturing	First-Line Supervisors of Production and Operating Workers
		First-Line Supervisors of Mechanics, Installers, and Repairers
		Maintenance Workers, Machinery
Healthcare	Health Science	Registered Nurses
		Medical and Clinical Laboratory Technicians
		Physical Therapy Assistants
Engineering and Engineering-Related	Science, Technology, Engineering, and Mathematics	Civil Engineers
Business and Financial Operations	Business Management and Administration	General and Operations Managers
		Medical and Health Services Managers
		Chief Executives
Transportation and Material Moving	Transportation	N/A



Additionally, the report identifies STEM occupations as an area of strategic and substantial growth in the coming decade. In fact, 35 of the 259 high-demand occupations (13.5 percent) listed in **Appendix E** are STEM or STEM-related occupations (indicated by blue text). Growth among STEM occupations is expected to outpace growth among all other occupations from 2017 to 2027; STEM occupations are expected to increase by 18 percent in Tennessee, while all other occupations are expected to increase by 12 percent.¹⁶ Most of the STEM occupations identified as high-demand by both TNECD and TDLWD fall into the Information Technology, Engineering, and Healthcare fields.



¹⁶ CERT, 2018 LEAP Report

Limitations and Conclusions

Limitations

Supply and demand analyses are useful for educators, employers, and policymakers, but there are two underlying limitations.

First, supply and demand analyses rely on historical data and assumptions about future economic conditions, as well as industry expansion or contraction. For this reason, projections are sometimes inaccurate for certain occupations, particularly emerging fields with limited historical data and those fields with high supply-to-demand ratios (oversupplied fields).

Second, the relationship between supply and demand is most direct at the sub-baccalaureate level and with specialized programs at the doctoral and professional level. For example, a person with a certificate in automotive repair or a medical specialization in cardiology is more likely to hold a job specific to their field of study than a person with a bachelor's degree in English. As such, it is more straightforward to link individuals with specialized degrees to specific occupations. This is not as true for those with versatile bachelor's and master's degrees, as graduates with these degrees are employable in many fields.

Conclusions

Projections of postsecondary degree production indicate that associate and bachelor's degrees will increase through academic year 2025, while certificates will decrease slightly. The growth in associate degrees is particularly noteworthy, with a projected increase of 22.1 percent from 2016 to 2025. Given the recent implementation of Tennessee Promise and Tennessee Reconnect, THEC is tracking trends in degree production at community colleges and TCATs. THEC will refine these degree projections as the implementation of the *2015-2025 Master Plan for Tennessee Postsecondary Education*¹⁷ continues.

General and Operations Managers, Registered Nurses, First-Line Supervisors of Production and Operating Workers, and Secondary School Teachers (except Special and Career/Technical Education) have the highest number of projected annual openings through 2026. These occupations require levels of education ranging from a high school diploma to a graduate degree. Alternatively, degrees leading to jobs in Drafting and Design Technology, Postsecondary Teachers (Teacher Education), Power Structural and Technical Systems Pathway, and Support Services (Instructional Coordinators) are oversupplied, as the number of trained Tennesseans far exceeds the number of jobs available.

In 2018, Tennessee has demonstrated enduring economic vitality. Unemployment rates reached a historic low of 3.3 percent in 2017 and have remained low through 2018 (between 3.3 and 3.7 percent).¹⁸ To ensure the continued economic health of the state, the alignment of academic supply with occupational demand is of the utmost importance. With a strong and stable workforce pipeline, Tennessee will remain economically competitive and position itself for future success.

¹⁷ The *2015-2025 Master Plan* is available at <https://www.tn.gov/the/research/redirect-research/master-plan.html>

¹⁸ Press Release, "Tennessee Unemployment Drops Ahead of Holiday Season":
<https://www.tn.gov/governor/news/2018/12/20/tennessee-unemployment-drops-ahead-of-holiday-season.html>

Appendix A: Degree Production Tables

All tables in this section include historical data for academic years 2006 through 2016 and projections of degree production for 2017 through 2025. (The thick horizontal line between 2016 and 2017 indicates where historical data end and projections begin.) **Table A-1** provides the projections of total degrees, disaggregated by degree level. **Tables A-2, A-3,** and **A-4** provide data for certificates, associate degrees, and bachelor's degrees, respectively. **Table A-5** provides the projections of total degrees, disaggregated by sector.

Table A-1: Total Degrees by Degree Level

Academic Year	Certificates	Associate Degree	Bachelor's Degree	Total
2005-06	24,750	8,391	26,381	59,522
2006-07	25,361	8,263	27,053	60,677
2007-08	25,294	8,062	27,725	61,081
2008-09	21,407	8,306	29,684	59,397
2009-10	23,932	8,902	30,227	63,061
2010-11	24,773	10,799	31,411	66,983
2011-12	24,476	12,023	32,902	69,401
2012-13	22,481	11,577	34,312	68,370
2013-14	22,687	11,897	33,830	68,414
2014-15	21,905	12,526	34,662	69,093
2015-16	22,637	13,117	35,389	71,143
2016-17	22,703	13,834	36,676	73,213
2017-18	22,741	14,071	37,034	73,846
2018-19	22,763	14,236	37,288	74,286
2019-20	22,873	14,147	36,987	74,006
2020-21	22,917	14,241	37,090	74,249
2021-22	22,889	14,432	37,456	74,777
2022-23	22,678	14,968	38,658	76,304
2023-24	22,466	15,551	39,944	77,961
2024-25	22,298	16,022	40,979	79,299

Source: THEC, 2017



Table A-2: Certificates by Sector

Academic Year	TCATs	Community Colleges	Private Institutions	Proprietary Institutions
2005-06	4,653	1,087	63	18,947
2006-07	5,385	979	50	18,947
2007-08	5,284	1,007	56	18,947
2008-09	5,217	1,012	62	15,116
2009-10	6,469	1,401	58	16,004
2010-11	7,483	1,613	66	15,611
2011-12	6,596	2,785	50	15,045
2012-13	6,395	2,173	77	13,836
2013-14	6,428	2,130	75	14,054
2014-15	6,468	2,614	71	12,752
2015-16	6,816	3,104	75	12,642
2016-17	7,481	3,172	74	11,977
2017-18	7,614	3,265	74	11,787
2018-19	7,706	3,331	74	11,651
2019-20	7,674	3,272	74	11,853
2020-21	7,731	3,303	74	11,808
2021-22	7,830	3,390	75	11,594
2022-23	8,090	3,659	75	10,855
2023-24	8,375	3,948	75	10,068
2024-25	8,605	4,182	75	9,436

Source: THEC, 2017



Table A-3: Associate Degrees by Sector

Academic Year	Community Colleges	Public Universities*	Private Institutions	Proprietary Institutions
2005-06	5,092	153	667	2,479
2006-07	5,088	160	536	2,479
2007-08	4,890	186	507	2,479
2008-09	4,917	175	453	2,761
2009-10	5,402	170	489	2,841
2010-11	6,103	232	534	3,930
2011-12	6,912	261	570	4,280
2012-13	7,333	323	646	3,275
2013-14	8,071	320	666	2,840
2014-15	8,836	367	611	2,712
2015-16	9,945	373	659	2,140
2016-17	9,451	383	650	3,350
2017-18	9,614	390	653	3,414
2018-19	9,732	396	655	3,454
2019-20	9,543	384	670	3,550
2020-21	9,578	385	675	3,604
2021-22	9,769	395	670	3,599
2022-23	10,438	433	639	3,458
2023-24	11,150	473	607	3,321
2024-25	11,722	506	582	3,213

*Associate degree production at public universities is low because only two public universities (Austin Peay State University and Tennessee State University) offered associate degrees from 2006 to 2016.

Source: THEC, 2017



Table A-4: Bachelor's Degrees by Sector

Academic Year	Public Universities	Private Institutions	Proprietary Institutions
2005-06	16,444	9,352	585
2006-07	16,700	9,768	585
2007-08	17,108	10,032	585
2008-09	18,144	10,128	1,412
2009-10	18,000	10,475	1,752
2010-11	18,832	10,767	1,812
2011-12	19,636	11,136	2,130
2012-13	20,498	11,686	2,128
2013-14	20,470	11,906	1,454
2014-15	20,507	12,157	1,998
2015-16	21,207	12,589	1,593
2016-17	21,645	12,658	2,372
2017-18	21,824	12,770	2,440
2018-19	21,950	12,851	2,486
2019-20	21,781	12,701	2,506
2020-21	21,827	12,719	2,543
2021-22	22,019	12,860	2,577
2022-23	22,664	13,370	2,623
2023-24	23,353	13,911	2,680
2024-25	23,908	14,345	2,726

Source: THEC, 2017



Table A-5: Total Degrees by Sector

Academic Year	TCATs	Community Colleges	Public Universities	Private Institutions	Proprietary Institutions
2005-06	4,653	6,179	16,597	10,082	22,011
2006-07	5,385	6,067	16,860	10,354	22,011
2007-08	5,284	5,897	17,294	10,595	22,011
2008-09	5,217	5,929	18,319	10,643	19,289
2009-10	6,469	6,803	18,170	11,022	20,597
2010-11	7,483	7,716	19,064	11,367	21,353
2011-12	6,596	9,697	19,897	11,756	21,455
2012-13	6,395	9,506	20,821	12,409	19,239
2013-14	6,428	10,201	20,790	12,647	18,348
2014-15	6,468	11,450	20,874	12,839	17,462
2015-16	6,816	13,049	21,580	13,323	16,375
2016-17	7,481	12,623	22,028	13,382	17,699
2017-18	7,614	12,879	22,214	13,497	17,641
2018-19	7,706	13,063	22,346	13,580	17,591
2019-20	7,674	12,815	22,165	13,445	17,909
2020-21	7,731	12,881	22,212	13,468	17,955
2021-22	7,830	13,159	22,414	13,605	17,770
2022-23	8,090	14,097	23,097	14,084	16,936
2023-24	8,375	15,098	23,826	14,593	16,069
2024-25	8,605	15,904	24,414	15,002	15,375

Source: THEC, 2017



Appendix B: Program of Study Clusters

Similar programs of study are grouped into 16 program of study clusters. **Table B-1** lists the two-digit cluster codes as well as the cluster titles, provided by TDLWD.

Table B-1: Program of Study Cluster Codes and Titles

Two-Digit Program of Study Cluster Code	Program of Study Cluster Title
01.0	Agriculture, Food, and Natural Resources
02.0	Architecture and Construction
03.0	Arts, A/V Technology, and Communications
04.0	Business Management and Administration
05.0	Education and Training
06.0	Finance
07.0	Government and Public Administration
08.0	Health Science
09.0	Hospitality and Tourism
10.0	Human Service
11.0	Information Technology
12.0	Public Safety, Corrections, and Security
13.0	Manufacturing
14.0	Sales
15.0	Science, Technology, Engineering, and Mathematics
16.0	Transportation

Source: TDLWD



Appendix C: Institutions Included in Completion Data

The number of completers provided by TDLWD includes students who completed a program at 100 public, private, and proprietary institutions across the state. **Table C-1** provides the full list of institutions represented in the completion data.

Table C-1: Institutions Included in TDLWD's Completion Data

Institution Name	System
Austin Peay State University	LGI
Baptist Memorial College of Health Sciences	TICUA
Belmont University	TICUA
Bethel University	TICUA
Bryan College-Dayton	TICUA
Carson-Newman University	TICUA
Chattanooga College Medical Dental and Technical Careers	Proprietary
Chattanooga State Community College	TBR
Christian Brothers University	TICUA
Cleveland State Community College	TBR
Columbia State Community College	TBR
Concorde Career College-Memphis	Proprietary
Cumberland University	TICUA
Daymar College-Clarksville	Proprietary
Daymar College-Murfreesboro	Proprietary
Daymar College-Nashville	Proprietary
DeVry University-Tennessee	Proprietary
Dyersburg State Community College	TBR
East Tennessee State University	LGI
Fisk University	TICUA
Fortis Institute-Cookeville	Proprietary
Fortis Institute-Nashville	Proprietary
Freed-Hardeman University	TICUA
Jackson State Community College	TBR
Johnson University	TICUA
King University	TICUA
Lane College	TICUA
Le Moyne-Owen College	TICUA
Lee University	TICUA
Lincoln Memorial University	TICUA
Lipscomb University	TICUA
Martin Methodist College	TICUA
Maryville College	TICUA
Memphis College of Art	TICUA
Middle Tennessee School of Anesthesia Inc	TICUA

Institution Name	System
Middle Tennessee State University	LGI
Miller-Motte Technical College-Chattanooga	Proprietary
Miller-Motte Technical College-Clarksville	Proprietary
Milligan College	TICUA
Motlow State Community College	TBR
Nashville State Community College	TBR
National College-Nashville	Proprietary
Northeast State Community College	TBR
Oxford Graduate School	Private, non-profit
Pellissippi State Community College	TBR
Remington College-Memphis Campus	Private, non-profit
Remington College-Nashville Campus	Private, non-profit
Rhodes College	TICUA
Roane State Community College	TBR
SAE Institute of Technology-Nashville	Proprietary
Sewanee-The University of the South	TICUA
South College	Proprietary
Southern Adventist University	TICUA
Southwest Tennessee Community College	TBR
Strayer University-Tennessee	Proprietary
TCAT Athens	TBR
TCAT Covington	TBR
TCAT Crossville	TBR
TCAT Crump	TBR
TCAT Dickson	TBR
TCAT Elizabethton	TBR
TCAT Harriman	TBR
TCAT Hartsville	TBR
TCAT Hohenwald	TBR
TCAT Jacksboro	TBR
TCAT Jackson	TBR
TCAT Knoxville	TBR
TCAT Livingston	TBR
TCAT McKenzie	TBR
TCAT McMinnville	TBR
TCAT Memphis	TBR
TCAT Morristown	TBR
TCAT Murfreesboro	TBR
TCAT Nashville	TBR
TCAT Newbern	TBR
TCAT Oneida-Huntsville	TBR
TCAT Paris	TBR
TCAT Pulaski	TBR

Institution Name	System
TCAT Ripley	TBR
TCAT Shelbyville	TBR
TCAT Whiteville	TBR
Tennessee State University	LGI
Tennessee Technological University	LGI
Tennessee Wesleyan University	TICUA
The University of Tennessee-Chattanooga	UT
The University of Tennessee-Health Science Center	UT
The University of Tennessee-Knoxville	UT
The University of Tennessee-Martin	UT
Trevecca Nazarene University	TICUA
Tusculum College	TICUA
Union University	TICUA
University of Memphis	LGI
University of Phoenix-Tennessee	Proprietary
Vanderbilt University	TICUA
Visible Music College	Private, non-profit
Volunteer State Community College	TBR
Walters State Community College	TBR
Welch College	TICUA
William Moore College of Technology	Private, non-profit
Williamson Christian College	Private, non-profit

Source: TDLWD, Projections from 2016 to 2026



Appendix D: Supply and Demand Reports for Tennessee's 25 Highest-Demand Programs of Study, Prepared by the Tennessee Department of Labor and Workforce Development¹⁹

¹⁹ **Appendix D** contains information on the average annual openings expected for occupations in high demand and the number of program completers in 2016 that may be qualified to fill those openings. If there are additional completers, this information appears on the bottom of each supply and demand report. This additional information should enhance understanding of the supply and demand relationships within these programs of study.

Area
Tennessee
Statewide

Projection Time (Years) = 10

Base Year: 2016

Average Occupational Growth Rate = 1.1

Projected Year

Employment: 2026

Cluster Grade = A
The outlook for this cluster is Excellent.
The GROWTH rate is above the average for all occupations across the state.
There are more job openings expected annually than there were training completers in a recent year.

Cluster Code	Cluster Title
04.100000	Business Management

DEMAND DATA		Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
SOC CODE(S)	SOC TITLES(S)						
111011	Chief Executives	6,705	7,029	513	0.5	\$123,170.00	Work experience, plus bachelor's degree
111021	General and Operations Managers	42,864	50,064	4,456	1.6	\$86,380.00	Work experience, plus bachelor's degree
112031	Public Relations and Fundraising Managers	957	1,113	97	1.5	\$90,500.00	Work experience, plus bachelor's degree
113011	Administrative Services Managers	6,792	8,135	723	1.8	\$74,540.00	Work experience, plus bachelor's degree
113051	Industrial Production Managers	5,220	5,790	435	1.0	\$89,670.00	Bachelor's degree
113061	Purchasing Managers	1,875	2,129	182	1.3	\$87,820.00	Work experience, plus bachelor's degree
113071	Trans., Storage, and Distribution Managers	504	563	46	1.1	\$77,490.00	Work experience in a related occupation
113111	Compensation and Benefits Managers	459	540	41	1.6	\$92,870.00	Bachelor's degree
113121	Human Resources Managers	2,901	3,471	307	1.8	\$88,750.00	Bachelor's degree
113131	Training and Development Managers	708	878	85	2.2	\$82,440.00	Bachelor's degree
119041	Architectural and Engineering Managers	3,121	3,686	291	1.7	\$115,760.00	Work experience, plus bachelor's degree
119111	Medical and Health Services Managers	8,700	10,911	965	2.3	\$87,960.00	Work experience, plus bachelor's degree
119141	Property, Real Estate & Community Assoc. Mgr.	8,420	9,830	825	1.6	\$46,360.00	Bachelor's degree
119199	Managers, All Other	11,756	13,306	1,021	1.2	\$79,930.00	No category defined
131011	Agents & Business Mgr., Artists, Performers, Athl.	2,170	2,390	280	1.0	\$63,920.00	Work experience, plus bachelor's degree
Totals:		103,151	119,835	10,265	1.5		

SUPPLY DATA		No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
CIP CODE(S)	CIP TITLE(S)					
151501	Engineering/Industrial Management.			84	117	
460401	Building/Property Maintenance and Management.	25	3			
501001	Arts, Entertainment, and Media Management, General.			65		
501003	Music Management.			550		
501004	Theatre/Theatre Arts Management.			1		
501099	Arts, Entertainment, and Media Management, Other.	6	14	44		
510701	Health/Health Care Administration/Management.		17	156	47	
510702	Hospital and Health Care Facilities Administration/Managemen			43	20	
510706	Health Information/Medical Records Administration/Administra			29	20	
510718	Long Term Care Administration/Management.			3		
510719	Clinical Research Coordinator.			5		
512211	Health Services Administration.				39	
513802	Nursing Administration.				22	
520101	Business/Commerce, General.			296	275	
520201	Business Administration and Management, General.			2,725	1,795	
520209	Transportation/Transportation Management.	37				
520213	Organizational Leadership.			463	110	
520299	Business Administration, Management and Operations, Other.		16	23	185	
520701	Entrepreneurship/Entrepreneurial Studies.	19		67	1	
520703	Small Business Administration/Management.			1		
520799	Entrepreneurial and Small Business Operations, Other.			3		
521001	Human Resources Management/Personnel Administration, General		8	75	58	
521101	International Business/Trade/Commerce.			69	20	
521301	Management Science, General.			49		
529999	Business, Management, Marketing, and Related Support Service	24		1	2	
Totals:		111	58	4,752	2,711	

TOTAL SUPPLY:	7,632
TOTAL DEMAND:	10,265
SUPPLY/DEMAND RATIO:	.74

Area
Tennessee
Statewide

Projection Time (Years) = 10
Average Occupational Growth Rate = 1.1

Base Year: 2016
Projected Year
Employment: 2026

Cluster Grade = C
The outlook for this cluster is Favorable.
The growth rate is positive.
There were more training completers in a recent year than job openings expected annually (but not more than 1.5 times as many training completers as job openings)

Cluster Code
08.1110000

Cluster Title
Nursing (RN)

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
251072	Nursing Instructors and Teachers, Postsecondary	1,190	1,520	135	2.5	\$61,910.00	Master's degree
291141	Registered Nurses	58,250	69,280	4,315	1.7	\$59,080.00	Associate degree
291161	Nurse Midwives	80	100	5	2.3	\$84,860.00	Master's degree
Totals:		59,520	70,900	4,455	1.8		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
513801	Registered Nursing/Registered Nurse.		1,369	2,654	747	
513803	Adult Health Nurse/Nursing.			258	29	
513804	Nurse Anesthetist.				7	
513805	Family Practice Nurse/Nursing.			11	278	
513806	Maternal/Child Health and Neonatal Nurse/Nursing.				25	
513807	Nurse Midwife/Nursing Midwifery.				23	
513808	Nursing Science.				15	
513809	Pediatric Nurse/Nursing.				59	
513810	Psychiatric/Mental Health Nurse/Nursing.			7	54	
513814	Critical Care Nursing.				71	
513816	Emergency Room/Trauma Nursing.				7	
513817	Nursing Education.			3	9	
513822	Women's Health Nurse/Nursing.				28	
513899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other.			4		
Totals:			1,369	2,937	1,352	

TOTAL SUPPLY: 5,658
TOTAL DEMAND: 4,455
SUPPLY/DEMAND RATIO: 1.27

Area
Tennessee
Statewide

Projection Time (Years) = 10

Base Year: 2016
Projected Year
Employment: 2026

Average Occupational Growth Rate = 1.1

Cluster Grade = B
The outlook for this cluster is Very Good.
The growth rate is positive but not above the average for all occupations.
There are more job openings expected annually than there were training completers in a recent year.

Cluster Code
13.1000000 Cluster Title
Precision Production Pathway

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual		Usual Education Requirements
					Growth (%)	Annual Median Salary	
499069	Precision Instrument and Equipment Repairers, All	240	260	25	0.8		Long-term on-the-job training
511011	First-Line Supervisors of Production and Operating	16,700	18,090	1,805	0.8	\$54,330.00	Work experience in a related occupation
512041	Structural Metal Fabricators and Fitters	2,060	1,850	190	-1.1	\$31,690.00	Moderate-term on-the-job training
512091	Fiberglass Laminators and Fabricators	520	600	70	1.4	\$34,550.00	Moderate-term on-the-job training
512092	Team Assemblers	64,980	63,310	7,215	-0.3		Moderate-term on-the-job training
513021	Butchers and Meat Cutters	2,890	3,020	370	0.4	\$29,840.00	Long-term on-the-job training
514011	Computer-Controlled Machine Tool Operators, Metal	2,140	2,240	225	0.5	\$36,400.00	Long-term on-the-job training
514012	Computer Numerically Controlled Machine Tool Progr	490	600	65	2.0	\$53,670.00	Long-term on-the-job training
514021	Extruding and Drawing Machine Setters, Operators,	2,000	1,780	165	-1.2	\$30,830.00	Moderate-term on-the-job training
514022	Forging Machine Setters, Operators, and Tenders, M	2,460	2,570	265	0.4	\$54,090.00	Moderate-term on-the-job training
514023	Rolling Machine Setters, Operators, and Tenders, M	720	700	70	-0.3	\$34,960.00	Moderate-term on-the-job training
514032	Drilling and Boring Machine Tool Setters, Operator	240	210	20	-1.3	\$34,580.00	Moderate-term on-the-job training
514033	Grinding, Lapping, Polishing, and Buffing Machine	1,900	1,840	190	-0.3	\$33,520.00	Moderate-term on-the-job training
514034	Lathe and Turning Machine Tool Setters, Operators,	830	830	80	0.0	\$34,660.00	Moderate-term on-the-job training
514035	Milling and Planing Machine Setters, Operators, an	490	420	40	-1.5	\$50,210.00	Moderate-term on-the-job training
514041	Machinists	7,700	8,320	860	0.8	\$40,460.00	Long-term on-the-job training
514051	Metal-Refining Furnace Operators and Tenders	460	480	45	0.4	\$40,810.00	Moderate-term on-the-job training
*****	*****	680	640	65	-0.6	\$46,690.00	Moderate-term on-the-job training
514062	Patternmakers, Metal and Plastic	30	40	5	2.9	\$47,740.00	Moderate-term on-the-job training
*****	*****	3,870	4,020	435	0.4	\$31,450.00	Moderate-term on-the-job training
514111	Tool and Die Makers	2,730	2,830	270	0.4	\$46,040.00	Long-term on-the-job training
514191	Heat Treating Equipment Setters, Operators, and Te	420	400	40	-0.5	\$34,820.00	Moderate-term on-the-job training
514192	Layout Workers, Metal and Plastic	190	190	20	0.0	\$43,610.00	Moderate-term on-the-job training
514194	Tool Grinders, Filers, and Sharpeners	140	140	15	0.0	\$35,270.00	Moderate-term on-the-job training
514199	Metal Workers and Plastic Workers, All Other	650	630	65	-0.3	\$34,430.00	Moderate-term on-the-job training
516061	Textile Bleaching and Dyeing Machine Operators and	60	50	5	-1.8	\$27,290.00	Moderate-term on-the-job training
*****	*****	130	120	15	-0.8	\$25,840.00	Long-term on-the-job training
516093	Upholsterers	1,180	1,290	135	0.9	\$25,500.00	Long-term on-the-job training
517011	Cabinetmakers and Bench Carpenters	1,840	1,920	200	0.4	\$29,470.00	Long-term on-the-job training
517021	Furniture Finishers	240	230	20	-0.4	\$31,320.00	Long-term on-the-job training
517041	Sawing Machine Setters, Operators, and Tenders, Wo	1,710	1,780	205	0.4	\$27,020.00	Moderate-term on-the-job training
517042	Woodworking Machine Setters, Operators, and Tender	1,850	1,960	215	0.6	\$27,310.00	Moderate-term on-the-job training
517099	Woodworkers, All Other	900	1,000	110	1.1	\$31,180.00	Moderate-term on-the-job training
518012	Power Distributors and Dispatchers	140	140	10	0.0	\$65,800.00	Long-term on-the-job training
518013	Power Plant Operators	540	560	50	0.4	\$84,100.00	Long-term on-the-job training
518021	Stationary Engineers and Boiler Operators	680	700	70	0.3	\$51,350.00	Long-term on-the-job training
519022	Grinding and Polishing Workers, Hand	310	270	25	-1.4	\$29,610.00	Moderate-term on-the-job training
519071	Jewelers and Precious Stone and Metal Workers	170	130	10	-2.6	\$39,180.00	Post-secondary vocational training
519082	Medical Appliance Technicians	1,900	2,550	310	3.0	\$34,600.00	Long-term on-the-job training
519083	Ophthalmic Laboratory Technicians	680	780	90	1.4	\$30,450.00	Moderate-term on-the-job training
519122	Painters, Transportation Equipment	530	580	60	0.9	\$43,070.00	Moderate-term on-the-job training
519194	Etchers and Engravers	80	80	10	0.0	\$29,960.00	Long-term on-the-job training
519195	Molders, Shapers, and Casters, Except Metal and Pl	1,110	1,190	125	0.7	\$29,520.00	Moderate-term on-the-job training
*****	*****	10	10	0	0.0		Short-term on-the-job training
518011	Nuclear Power Reactor Operators	530	510	45	-0.4	\$86,330.00	Long-term on-the-job training
Totals:		130,120	131,860	14,325	0.1		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
480501	Machine Tool Technology/Machinist.	213	46			
480503	Machine Shop Technology/Assistant.	73	53			245
480507	Tool and Die Technology/Technician.	17				
480510	Computer Numerically Controlled (CNC) Machinist Technology/CNC	13				
Totals:		316	99			245

TOTAL SUPPLY: 660
TOTAL DEMAND: 14,325
SUPPLY/DEMAND RATIO: .05

Area
Tennessee
Statewide

Projection Time (Years) = 10
Average Occupational Growth Rate = 1.1

Base Year: 2016
Projected Year
Employment: 2026

Cluster Grade = B
The outlook for this cluster is Very Good.
The growth rate is positive but not above the average for all occupations.
There are more job openings expected annually than there were training completers in a recent year.

Cluster Code	Cluster Title
05.1180000	Middle, Secondary and Vocational Education Teachers

DEMAND DATA		Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
SOC CODE(S)	SOC TITLES(S)						
251192	Home Economics Teachers, Postsecondary	40	50	5	2.3	\$56,440.00	Master's degree
251194	Vocational Education Teachers, Postsecondary	1,610	1,800	145	1.1	\$46,780.00	Associate degree
252022	Middle School Teachers, Except Special and Career/	9,950	10,870	820	0.9	\$48,570.00	Bachelor's degree
252023	Career/Technical Education Teachers, Middle Schoo	100	110	10	1.0	\$56,600.00	Bachelor's degree
252031	Secondary School Teachers, Except Special and Care	18,590	20,320	1,495	0.9	\$50,070.00	Bachelor's degree
252032	Career/Technical Education Teachers, Secondary Sch	2,390	2,580	190	0.8	\$50,060.00	Bachelor's degree
Totals:		32,680	35,730	2,665	0.9		

SUPPLY DATA		No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
CIP CODE(S)	CIP TITLE(S)					
130201	Bilingual and Multilingual Education.				2	
131203	Junior High/Intermediate/Middle School Education and Teachin			119	6	
131205	Secondary Education and Teaching.			107	79	
131206	Teacher Education, Multiple Levels.			597		
131302	Art Teacher Education.			16	2	
131303	Business Teacher Education.			8	8	
131305	English/Language Arts Teacher Education.			16	5	
131306	Foreign Language Teacher Education.			6	9	
131307	Health Teacher Education.			7	2	
131308	Family and Consumer Sciences/Home Economics Teacher Educatio			2		
131311	Mathematics Teacher Education.			18	6	
131312	Music Teacher Education.			57	3	
131314	Physical Education Teaching and Coaching.			67	1	
131315	Reading Teacher Education.			1	116	
131321	Computer Teacher Education.				7	
131322	Biology Teacher Education.			10		
131323	Chemistry Teacher Education.			4		
131324	Drama and Dance Teacher Education.			3		
131325	French Language Teacher Education.			3		
131328	History Teacher Education.			20	4	
131330	Spanish Language Teacher Education.			5		
131335	Psychology Teacher Education.			1		
131399	Teacher Education and Professional Development, Specific Sub				136	
131401	Teaching English as a Second or Foreign Language/ESL Languag			20	57	
139999	Education, Other.			23		
161299	Classics and Classical Languages, Literatures, and Linguisti			3		
190101	Family and Consumer Sciences/Human Sciences, General.			103	12	
190401	Family Resource Management Studies, General.			83		
190402	Consumer Economics.			28		
190701	Human Development and Family Studies, General.			94	25	
190704	Family Systems.			7		
190901	Apparel and Textiles, General.			28		
500912	Music Pedagogy.			2		
Totals:				1,458	480	

TOTAL SUPPLY:	1,938
TOTAL DEMAND:	2,665
SUPPLY/DEMAND RATIO:	.73

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1

Base Year: 2016
 Projected Year: 2026
 Employment:

Cluster Code: **11.340000**
 Cluster Title: **Web Multimedia Management, Programming**

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
113021	Computer and Information Systems Managers	5,730	7,260	620	2.4	\$109,610.00	Work experience, plus bachelor's degree
151111	Computer and Information Research Scientists	160	210	15	2.8	\$102,750.00	Master's degree
151121	Computer Systems Analysts	7,410	9,330	720	2.3	\$73,530.00	Associate degree
151131	Computer Programmers	4,430	4,890	335	1.0	\$74,060.00	Bachelor's degree
151132	Software Developers, Applications	6,230	9,500	820	4.3	\$87,890.00	Bachelor's degree
151133	Software Developers, Systems Software	4,140	5,600	450	3.1	\$86,890.00	Bachelor's degree
151141	Database Administrators	1,290	1,580	120	2.0	\$79,060.00	Bachelor's degree
151151	Computer Support Specialists	10,090	13,300	1,160	2.8	\$45,560.00	Associate degree
251021	Computer Science Teachers, Postsecondary	580	640	50	1.0	\$72,060.00	Master's degree
Totals:		40,060	52,310	4,290	2.7		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
110101	Computer and Information Sciences, General.		214	165	16	
110103	Information Technology.		59	123	75	
110104	Informatics.			1	15	
110199	Computer and Information Sciences, Other.			1		
110201	Computer Programming/Programmer, General.		9	3		
110401	Information Science/Studies.			5	7	
110501	Computer Systems Analysis/Analyst.			10		
110701	Computer Science.			459	125	
110802	Data Modeling/Warehousing and Database Administration.			5	6	
111005	Information Technology Project Management.			10		
111006	Computer Support Specialist.		2			
111099	Computer/Information Technology Services Administration andM			21		
119999	Computer and Information Sciences and Support Services, Othe			5	10	
140903	Computer Software Engineering.			2	2	
151202	Computer Technology/Computer Systems Technology.		21			
512706	Medical Informatics.		15	21	9	
521201	Management Information Systems, General.			195	1	
Totals:			320	1,026	266	

TOTAL SUPPLY: 1,612
TOTAL DEMAND: 4,290
SUPPLY/DEMAND RATIO: .38

Area
Tennessee
Statewide

Projection Time (Years) = 10
Average Occupational Growth Rate = 1.1

Base Year: 2016
Projected Year
Employment: 2026

Cluster Grade = B
The outlook for this cluster is Very Good.
The growth rate is positive but not above the average for all occupations.
There are more job openings expected annually than there were training completers in a recent year.

Cluster Code
13.2200000

Cluster Title
Prod. Design, Ops, and Maint. Path -- Operations & Maint.

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
131023	Purchasing Agents, exc. Wholesale, Retail & Farm.	4,040	4,020	340	0.0		Bachelor's degree
472011	Boilermakers	300	320	30	0.6	\$56,340.00	Long-term on-the-job training
474021	Elevator Installers and Repairers	360	420	50	1.6	\$67,400.00	Long-term on-the-job training
491011	First-Line Supervisors of Mechanics, Installers, a	10,910	12,300	1,110	1.2	\$62,030.00	Work experience in a related occupation
499011	Mechanical Door Repairers	290	320	25	1.0	\$37,910.00	Moderate-term on-the-job training
499031	Home Appliance Repairers	600	710	70	1.7	\$35,800.00	Long-term on-the-job training
499041	Industrial Machinery Mechanics	8,840	9,950	915	1.2	\$46,990.00	Long-term on-the-job training
499043	Maintenance Workers, Machinery	4,580	5,430	590	1.7	\$47,480.00	Long-term on-the-job training
499044	Millwrights	950	1,080	100	1.3	\$50,050.00	Long-term on-the-job training
*****	*****	140	160	15	1.3		Moderate-term on-the-job training
499062	Medical Equipment Repairers	1,170	1,310	120	1.1	\$40,340.00	Moderate-term on-the-job training
499063	Musical Instrument Repairers and Tuners	130	140	10	0.7	\$33,790.00	Long-term on-the-job training
499071	Maintenance and Repair Workers, General	31,310	35,210	3,595	1.2	\$36,460.00	Post-secondary vocational training
499091	Coin, Vending, and Amusement Machine Servicers and	780	690	70	-1.2	\$36,180.00	Moderate-term on-the-job training
499094	Locksmiths and Safe Repairers	390	420	40	0.7	\$29,990.00	Moderate-term on-the-job training
516063	Textile Knitting and Weaving Machine Setters, Oper	460	330	35	-3.3	\$23,640.00	Long-term on-the-job training
*****	*****	370	280	30	-2.7	\$27,790.00	Moderate-term on-the-job training
516091	Extruding and Forming Machine Setters, Operators,	690	710	85	0.3	\$37,990.00	Moderate-term on-the-job training
518091	Chemical Plant and System Operators	590	590	60	0.0	\$47,010.00	Long-term on-the-job training
519011	Chemical Equipment Operators and Tenders	2,750	2,480	250	-1.0	\$56,630.00	Moderate-term on-the-job training
519061	Inspectors, Testers, Sorters, Samplers, and Weighe	13,780	13,320	1,555	-0.3	\$33,880.00	Moderate-term on-the-job training
*****	*****	300	320	30	0.6		Post-secondary vocational training
Totals:		83,730	90,510	9,125	0.8		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
150403	Electromechanical Technology/Electromechanical Engineering T	149	35			
150499	Electromechanical and Instrumentation and Maintenance Techno	41				49
410303	Chemical Process Technology.	25				
470000	Mechanics and Repairers, General.	7				
470303	Industrial Mechanics and Maintenance Technology.	569	54			
479999	Mechanic and Repair Technologies/Technicians, Other.	11				
520205	Operations Management and Supervision.	57			37	
Totals:		859	89		37	49

TOTAL SUPPLY: 1,034
TOTAL DEMAND: 9,125
SUPPLY/DEMAND RATIO: .11

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10

Base Year: 2016

Average Occupational Growth Rate = 1.1

Projected Year
 Employment: 2026

Cluster Code
 14.100000

Cluster Title
 Marketing Management and Research

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
112011	Advertising and Promotions Managers	770	870	95	1.2	\$69,310.00	Work experience, plus bachelor's degree
112021	Marketing Managers	3,590	4,350	405	1.9	\$99,650.00	Work experience, plus bachelor's degree
131161	Market Research Analysts & Marketing Specialists	3,765	5,070	550	3.0	\$55,290.00	Bachelor's degree
Totals:		8,125	10,290	1,050	2.4		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
090903	Advertising.			56		
190905	Apparel and Textile Marketing Management.			4		
521401	Marketing/Marketing Management, General.			613	42	
Totals:				673	42	

TOTAL SUPPLY: 715
TOTAL DEMAND: 1,050
SUPPLY/DEMAND RATIO: .68

Cluster Grade = B
The outlook for this cluster is Very Good.
The growth rate is positive but not above the average for all occupations.
There are more job openings expected annually than there were training completers in a recent year.

Area: Tennessee Statewide
 Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1
 Base Year: 2016
 Projected Year: 2026
 Cluster Code: 14.2000000
 Cluster Title: Selling and Sales Management

DEMAND DATA		Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
SOC CODE(S)	SOC TITLES(S)						
112022	Sales Managers	9,260	11,070	1,030	1.8	\$94,830.00	Work experience, plus bachelor's degree
132021	Appraisers and Assessors of Real Estate	1,190	1,410	105	1.7	\$48,350.00	Post-secondary vocational training
271023	Floral Designers	1,220	1,090	95	-1.1	\$24,630.00	Moderate-term on-the-job training
271026	Merchandise Displayers and Window Trimmers	2,690	2,850	270	0.6	\$27,780.00	Moderate-term on-the-job training
411011	First-Line Supervisors of Retail Sales Workers	38,940	40,810	4,340	0.5	\$36,730.00	Work experience in a related occupation
411012	First-Line Supervisors of Non-Retail Sales Workers	9,320	10,680	1,025	1.4	\$69,220.00	Work experience in a related occupation
413011	Advertising Sales Agents	2,440	2,840	365	1.5	\$41,470.00	Moderate-term on-the-job training
413099	Sales Representatives, Services, All Other	16,870	20,330	2,540	1.9	\$44,490.00	No category defined
414011	Sales Representatives, Wholesale and Manufacturing	8,960	10,140	1,070	1.2	\$67,900.00	Moderate-term on-the-job training
414012	Sales Representatives, Wholesale and Manufacturing	21,970	24,240	2,535	1.0	\$50,630.00	Moderate-term on-the-job training
*****	*****	20	20	5	0.0	\$17,710.00	Moderate-term on-the-job training
419021	Real Estate Brokers	1,150	1,440	145	2.3	\$66,760.00	Work experience in a related occupation
419022	Real Estate Sales Agents	3,070	3,690	370	1.9	\$30,710.00	Post-secondary vocational training
419031	Sales Engineers	950	1,170	130	2.1	\$81,350.00	Bachelor's degree
Totals:		118,050	131,780	14,025	1.1		

SUPPLY DATA		No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
CIP CODE(S)	CIP TITLE(S)					
520208	E-Commerce/Electronic Commerce.				14	
521801	Sales, Distribution, and Marketing Operations, General.			3		
521804	Selling Skills and Sales Operations.	12				
Totals:		12		3	14	
TOTAL SUPPLY:		29				
TOTAL DEMAND:		14,025				
SUPPLY/DEMAND RATIO:		.00				

Area
Tennessee
Statewide

Projection Time (Years) = 10
Average Occupational Growth Rate = 1.1

Base Year: 2016
Projected Year
Employment: 2026

Cluster Grade = C
The outlook for this cluster is Favorable.
The growth rate is positive.
There were more training completers in a recent year than job openings expected annually (but not more than 1.5 times as many training completers as job openings)

Cluster Code 12.4130000
Cluster Title Law Enforcement

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
194092	Forensic Science Technicians	400	480	55	1.8	\$51,250.00	Associate degree
251111	Criminal Justice and Law Enforcement Teachers, Pos	250	290	25	1.5	\$49,450.00	Doctor's degree
331012	First-Line Supervisors of Police and Detectives	4,060	4,350	275	0.7	\$61,340.00	Work experience in a related occupation
331099	First-Line Supervisors of Protective Service Worke	1,230	1,380	140	1.2	\$45,280.00	Work experience in a related occupation
333011	Bailiffs	360	350	30	-0.3	\$33,920.00	Moderate-term on-the-job training
333021	Detectives and Criminal Investigators	1,410	1,490	95	0.6	\$56,690.00	Work experience in a related occupation
333051	Police and Sheriff's Patrol Officers	13,160	14,140	960	0.7	\$43,610.00	Long-term on-the-job training
*****	*****	90	90	5	0.0		Long-term on-the-job training
*****	*****	240	260	25	0.8	\$33,520.00	Moderate-term on-the-job training
435031	Police, Fire, and Ambulance Dispatchers	2,520	2,760	260	0.9	\$33,770.00	Moderate-term on-the-job training
Totals:		23,720	25,590	1,870	0.8		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
430103	Criminal Justice/Law Enforcement Administration.	4	61	810	109	
430104	Criminal Justice/Safety Studies.		66	323		
430106	Forensic Science and Technology.			18		
430107	Criminal Justice/Police Science.	334	92			679
430117	Financial Forensics and Fraud Investigation.				4	
450401	Criminology.			1		
Totals:		338	219	1,152	113	679

TOTAL SUPPLY: 2,501
TOTAL DEMAND: 1,870
SUPPLY/DEMAND RATIO: 1.34

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area: Tennessee Statewide
 Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1
 Cluster Code: 08.2220000
 Cluster Title: Medical and Clinical Laboratory Technicians

Base Year: 2016
 Projected Year: 2026

DEMAND DATA		Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
SOC CODE(S)	SOC TITLES(S)						
292012	Medical and Clinical Laboratory Technicians	7,280	8,650	620	1.7		Associate degree
Totals:		7,280	8,650	620	1.7		

SUPPLY DATA		No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
CIP CODE(S)	CIP TITLE(S)					
511004	Clinical/Medical Laboratory Technician.		65	6		
Totals:			65	6		

TOTAL SUPPLY: 71
TOTAL DEMAND: 620
SUPPLY/DEMAND RATIO: .11

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1

Base Year: 2016
 Projected Year Employment: 2026

Cluster Code
 15.1130000

Cluster Title
 Civil Engineering

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
172051	Civil Engineers	5,230	6,720	570	2.5	\$87,450.00	Bachelor's degree
Totals:		5,230	6,720	570	2.5		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
140801	Civil Engineering, General.			173	73	
Totals:				173	73	

TOTAL SUPPLY:	246
TOTAL DEMAND:	570
SUPPLY/DEMAND RATIO:	.43

Area
Tennessee
Statewide

Projection Time (Years) = 10

Base Year: 2016
Projected Year
Employment: 2026

Average Occupational Growth Rate = 1.1

Cluster Grade = B
The outlook for this cluster is Very Good.
The growth rate is positive but not above the average for all occupations.
There are more job openings expected annually than there were training completers in a recent year.

Cluster Code

Cluster Title

05.1110000

Educational Administration

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
119031	Education Admin., Preschool & Childcare Center	940	1,020	80	0.8	\$42,720.00	Bachelor's degree
119032	Education Admin., Elementary & Secondary	5,600	6,130	485	0.9	\$77,500.00	Master's degree
119033	Education Administrators, Postsecondary	5,980	6,670	535	1.1	\$79,480.00	Master's degree
*****	*****	2,510	2,790	225	1.1	\$63,480.00	No category defined
Totals:		15,030	16,610	1,325	1.0		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
130401	Educational Leadership and Administration, General.			1	688	
130406	Higher Education/Higher Education Administration.				56	
130499	Educational Administration and Supervision, Other.				58	
Totals:				1	802	

TOTAL SUPPLY: 803
TOTAL DEMAND: 1,325
SUPPLY/DEMAND RATIO: .61

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1

Base Year: 2016
 Projected Year Employment: 2026

Cluster Code: 08.1130000
 Cluster Title: Physical Therapy Assistant

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
312021	Physical Therapist Assistants	2,730	3,700	475	3.1	\$58,080.00	Associate degree
Totals:		2,730	3,700	475	3.1		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
510806	Physical Therapist Assistant.		203			
512308	Physical Therapy/Therapist.		10			
Totals:			213			

TOTAL SUPPLY:	213
TOTAL DEMAND:	475
SUPPLY/DEMAND RATIO:	.45

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area: Tennessee Statewide
 Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1
 Base Year: 2016
 Projected Year: 2026
 Cluster Code: 11.100000
 Cluster Title: Network Systems

DEMAND DATA		Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
151122	Information Security Analysts, Web Developers, and	1,270	1,750	150	3.3	\$81,030.00	Bachelor's degree
151134	Web Developers	2,050	2,590	215	2.4	\$60,080.00	Bachelor's degree
151142	Network and Computer Systems Administrators	5,292	6,110	428	1.4	\$75,760.00	No category defined
151143	Computer Network Architects	1,035	1,405	113	3.1	\$96,540.00	Bachelor's degree
151152	Computer Network Support Specialists	3,150	3,820	315	1.9	\$55,280.00	No category defined
Totals:		12,797	15,675	1,220	2.0		

SUPPLY DATA		No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
110901	Computer Systems Networking and Telecommunications.	38	34	1		
111001	System Administration/Administrator.		35			
111003	Computer and Information Systems Security.	16		29	1	
Totals:		54	69	30	1	

TOTAL SUPPLY: 154
TOTAL DEMAND: 1,220
SUPPLY/DEMAND RATIO: .13

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1

Base Year: 2016
 Projected Year
 Employment: 2026

Cluster Code
10.3110000
 Cluster Title
Social Work

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
211013	Marriage and Family Therapists	740	990	110	3.0	\$34,100.00	Master's degree
211021	Child, Family, and School Social Workers	5,050	5,630	590	1.1	\$41,990.00	Bachelor's degree
211022	Healthcare Social Workers	3,140	3,810	415	2.0	\$51,860.00	Bachelor's degree
211023	Mental Health and Substance Abuse Social Workers	1,780	2,170	235	2.0	\$32,440.00	Master's degree
211029	Social Workers, All Other	980	1,100	115	1.2	\$47,030.00	No category defined
211092	Probation Officers and Correctional Treatment Spec	1,840	1,990	175	0.8	\$38,880.00	Bachelor's degree
251113	Social Work Teachers, Postsecondary	240	260	20	0.8	\$58,030.00	Doctor's degree
Totals:		13,770	15,950	1,660	1.5		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
190707	Family and Community Services.				1	
440701	Social Work.			59	509	
440799	Social Work, Other.			12		
511505	Marriage and Family Therapy/Counseling.				59	
Totals:				71	569	

TOTAL SUPPLY: 640
TOTAL DEMAND: 1,660
SUPPLY/DEMAND RATIO: .39

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10
 Average Occupational Growth Rate = 1.1

Base Year: 2016
 Projected Year Employment: 2026

Cluster Code: 02.1220000
 Cluster Title: Technical Design & Preconstruction

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
119021	Construction Managers	7,850	9,100	695	1.5	\$72,800.00	Bachelor's degree
131051	Cost Estimators	1,892	2,172	222	1.4	\$59,010.00	Bachelor's degree
*****	*****	1,590	1,740	155	0.9	\$30,830.00	Associate degree
Totals:		11,332	13,012	1,072	1.4		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
150101	Architectural Engineering Technology/Technician.	14	4			
460499	Building/Construction Finishing, Management, and Inspection,		33			
522001	Construction Management.			27		
Totals:		14	37	27		
TOTAL SUPPLY:		78				
TOTAL DEMAND:		1,072				
SUPPLY/DEMAND RATIO:		.07				

Cluster Grade = A
 The outlook for this cluster is Excellent.
 The GROWTH rate is above the average for all occupations across the state.
 There are more job openings expected annually than there were training completers in a recent year.

Area
 Tennessee
 Statewide

Projection Time (Years) = 10

Base Year: 2016
 Projected Year
 Employment: 2026

Average Occupational Growth Rate = 1.1

Cluster Code
 07.7160000

Cluster Title
 Public and Nonprofit Management and Administration

DEMAND DATA

SOC CODE(S)	SOC TITLES(S)	Estimated Employment	Projected Employment	Average Annual Openings	Average Annual Growth (%)	Annual Median Salary	Usual Education Requirements
111011	Chief Executives	745	781	57	0.5	\$123,170.00	Work experience, plus bachelor's degree
111021	General and Operations Managers	2,736	3,196	284	1.6	\$86,380.00	Work experience, plus bachelor's degree
111031	Legislators	1,130	1,220	90	0.8	\$20,100.00	Work experience, plus bachelor's degree
112031	Public Relations and Fundraising Managers	83	97	8	1.5	\$90,500.00	Work experience, plus bachelor's degree
113011	Administrative Services Managers	1,199	1,436	128	1.8	\$74,540.00	Work experience, plus bachelor's degree
113061	Purchasing Managers	185	211	18	1.3	\$87,820.00	Work experience, plus bachelor's degree
113071	Trans., Storage, and Distribution Managers	4,200	4,690	380	1.1	\$77,490.00	Work experience in a related occupation
113111	Compensation and Benefits Managers	51	60	5	1.6	\$92,870.00	Bachelor's degree
113121	Human Resources Managers	359	429	38	1.8	\$88,750.00	Bachelor's degree
119041	Architectural and Engineering Managers	309	365	29	1.7	\$115,760.00	Work experience, plus bachelor's degree
119111	Medical and Health Services Managers	860	1,079	95	2.3	\$87,960.00	Work experience, plus bachelor's degree
119131	Postmasters and Mail Superintendents	280	220	10	-2.4	\$81,660.00	Work experience in a related occupation
119151	Social and Community Service Managers	1,040	1,232	116	1.7	\$60,920.00	Bachelor's degree
*****	*****	150	180	15	1.8	\$69,390.00	Bachelor's degree
119199	Managers, All Other	5,038	5,702	437	1.2	\$79,930.00	No category defined
Totals:		18,365	20,897	1,710	1.3		

SUPPLY DATA

CIP CODE(S)	CIP TITLE(S)	No of Certs	No of Assoc	No of Bach	No of Grads	No of SecCom
430302	Crisis/Emergency/Disaster Management.		3	35		
440401	Public Administration.			16	51	
440501	Public Policy Analysis.			30	16	
440502	Education Policy Analysis.				21	
440503	Health Policy Analysis.			4		
449999	Public Administration and Social Service Professions, Other.		4	5		
451001	Political Science and Government, General.			648		
451002	American Government and Politics (United States).			1		
451004	Political Economy.			5		
451099	Political Science and Government, Other.			2		
451201	Urban Studies/Affairs.			26		
520206	Non-Profit/Public/Organizational Management.		1	90	18	
Totals:			8	862	106	

TOTAL SUPPLY: 976
TOTAL DEMAND: 1,710
SUPPLY/DEMAND RATIO: .57

Appendix E: Occupations with High Employer Demand by Region

Table E-1 lists all 259 occupations identified by TNECD as having high employer demand in one or more Tennessee regions. In the table, an “X” indicates high demand for an occupation in an individual region of Tennessee. STEM and STEM-related occupations are indicated by [blue text](#).

Table E-1: Occupations with High Employer Demand by Region

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
Management (11-0000)											
11-2021	Marketing Managers					X					1
11-2022	Sales Managers			X							1
11-3021	Computer and Information Systems Managers					X					1
11-3071	Transportation, Storage, and Distribution Managers		X	X					X		3
11-3121	Human Resources Managers	X	X	X	X	X				X	6
11-3131	Training and Development Managers					X					1
11-9013	Farmers, Ranchers, and Other Agricultural Managers						X				1
11-9021	Construction Managers	X	X	X	X	X	X	X	X	X	9
11-9031	Education Administrators, Preschool and Childcare Center/Program	X									1
11-9033	Education Administrators, Postsecondary		X								1
11-9051	Food Service Managers	X	X	X	X	X	X	X	X	X	9
11-9081	Lodging Managers					X					1
11-9141	Property, Real Estate, and Community Association Managers	X	X	X	X			X		X	6
11-9151	Social and Community Service Managers	X	X	X	X	X	X	X	X	X	9
11-1021	General and Operations Managers	X	X	X	X	X	X	X	X	X	9
Business and Financial Operations (13-0000)											
13-1011	Agents and Business Managers of Artists, Performers, and Athletes				X						1
13-1041	Compliance Officers		X							X	2
13-1051	Cost Estimators	X	X		X	X			X	X	6
13-1071	Human Resources Specialists	X	X	X	X	X	X	X	X	X	9
13-1081	Logisticians		X	X	X	X		X		X	6
13-1111	Management Analysts	X	X	X	X	X	X	X	X	X	9

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
13-1121	Meeting, Convention, and Event Planners	X			X	X					3
13-1141	Compensation, Benefits, and Job Analysis Specialists					X					1
13-1151	Training and Development Specialists	X	X	X	X	X	X	X	X		8
13-1161	Market Research Analysts and Marketing Specialists	X	X	X	X	X	X	X	X	X	9
13-1199	Business Operations Specialists, All Other		X	X			X	X		X	5
13-2011	Accountants and Auditors	X	X	X		X	X	X		X	7
13-2051	Financial Analysts		X			X		X		X	4
13-2072	Loan Officers					X		X			2
13-2082	Tax Preparers			X		X		X	X		4
Computer and Mathematical (15-0000)											
15-1121	Computer Systems Analysts					X	X				2
15-1122	Information Security Analysts				X	X			X		3
15-1131	Computer Programmers		X		X	X		X		X	5
15-1132	Software Developers, Applications		X	X	X	X	X	X	X	X	8
15-1133	Software Developers, Systems Software					X		X		X	3
15-1134	Web Developers	X			X	X			X		4
15-1141	Database Administrators					X					1
15-1142	Network and Computer Systems Administrators		X	X	X	X	X	X	X	X	8
15-1143	Computer Network Architects	X			X	X			X		4
15-1151	Computer User Support Specialists	X	X	X	X	X	X	X	X	X	9
15-1152	Computer Network Support Specialists			X			X	X			3
15-1199	Computer Occupations, All Other			X				X	X	X	4
15-2031	Operations Research Analysts					X					1
Architecture and Engineering (17-0000)											
17-2051	Civil Engineers						X	X		X	3
17-2081	Environmental Engineers					X					1
17-2141	Mechanical Engineers						X			X	2
17-2199	Engineers, All Other						X			X	2
17-3013	Mechanical Drafters				X		X		X		3
17-3022	Civil Engineering Technicians		X				X				2
17-3026	Industrial Engineering Technicians			X							1
17-3027	Mechanical Engineering Technicians						X				1
Life, Physical, and Social Science (19-0000)											
19-2031	Chemists								X		1

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
19-2041	Environmental Scientists and Specialists, Including Health						X				1
19-4099	Life, Physical, and Social Science Technicians, All Other								X		1
Community and Social Service (21-0000)											
21-1012	Educational, Guidance, School, and Vocational Counselors	X				X		X	X		4
21-1018	Substance Abuse, Behavioral Disorder, and Mental Health Counselors	X	X	X	X	X	X	X	X	X	9
21-1021	Child, Family, and School Social Workers	X	X	X		X	X	X		X	7
21-1022	Healthcare Social Workers	X	X	X	X	X	X	X	X	X	9
21-1023	Mental Health and Substance Abuse Social Workers	X	X	X		X	X	X		X	7
21-1092	Probation Officers and Correctional Treatment Specialists	X	X	X		X	X	X	X	X	8
21-1093	Social and Human Service Assistants	X	X	X	X	X	X	X	X	X	9
21-1099	Community and Social Service Specialists, All Other	X						X			2
Legal Occupations (23-0000)											
23-2011	Paralegals and Legal Assistants	X	X		X	X		X			5
Education, Training, and Library (25-0000)											
25-2011	Preschool Teachers, Except Special Education	X	X					X	X		4
25-3021	Self-Enrichment Education Teachers	X			X	X	X	X		X	6
25-3097	Teachers and Instructors, All Other	X				X		X	X		4
Arts, Design, Entertainment, Sports, and Media (27-0000)											
27-1024	Graphic Designers	X	X		X	X		X		X	6
27-1026	Merchandise Displayers and Window Trimmers	X			X	X	X	X	X	X	7
27-2012	Producers and Directors	X			X						2
27-2022	Coaches and Scouts	X	X	X	X		X	X	X	X	8
27-3031	Public Relations Specialists	X	X		X	X	X	X	X	X	8
27-3041	Editors				X					X	2
27-4011	Audio and Video Equipment Technicians				X						1
Healthcare Practitioners and Technical (29-0000)											
29-1071	Physician Assistants		X		X						2
29-1122	Occupational Therapists					X					1
29-1123	Physical Therapists			X		X					2
29-1131	Veterinarians	X	X	X	X	X			X		6
29-2052	Pharmacy Technicians		X				X				2
29-2056	Veterinary Technologists and Technicians	X									1
29-2061	Licensed Practical and Licensed Vocational Nurses	X	X	X	X	X	X	X	X	X	9

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
29-2071	Medical Records and Health Information Technicians					X					1
29-2081	Opticians, Dispensing			X			X				2
29-9011	Occupational Health and Safety Specialists					X					1
Healthcare Support (31-0000)											
31-1014	Nursing Assistants					X			X	X	3
31-2011	Occupational Therapy Assistants		X							X	2
31-2021	Physical Therapist Assistants	X	X	X	X	X	X	X	X	X	9
31-9011	Massage Therapists				X			X	X		3
31-9091	Dental Assistants	X		X		X	X			X	5
31-9092	Medical Assistants	X	X	X	X	X	X	X	X	X	9
31-9094	Medical Transcriptionists	X				X		X	X		4
31-9095	Pharmacy Aides		X								1
31-9096	Veterinary Assistants and Laboratory Animal Caretakers						X			X	2
31-9097	Phlebotomists	X	X		X	X			X	X	6
31-9099	Healthcare Support Workers, All Other		X	X	X	X	X	X			6
Protective Service (33-0000)											
33-1099	First-Line Supervisors of Protective Service Workers, All Other				X	X					2
33-3021	Detectives and Criminal Investigators		X								1
33-9032	Security Guards	X	X				X	X	X	X	6
33-9091	Crossing Guards				X						1
33-9099	Protective Service Workers, All Other	X					X	X			3
Food Preparation and Serving Related (35-0000)											
35-1011	Chefs and Head Cooks	X	X	X	X	X	X	X	X	X	9
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	X	X	X	X	X	X	X	X	X	9
Building and Grounds Cleaning and Maintenance (37-0000)											
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	X	X	X	X	X	X	X	X	X	9
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	X			X			X	X		4
37-2021	Pest Control Workers	X	X	X	X	X	X	X		X	8
37-3011	Landscaping and Groundskeeping Workers	X		X			X		X	X	5
37-3013	Tree Trimmers and Pruners	X	X								2
37-3019	Grounds Maintenance Workers, All Other				X						1

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
Personal Care and Service (39-0000)											
39-1021	First-Line Supervisors of Personal Service Workers						X			X	2
39-5012	Hairdressers, Hairstylists, and Cosmetologists						X			X	2
39-5094	Skincare Specialists							X			1
39-9031	Fitness Trainers and Aerobics Instructors	X	X	X	X	X	X	X	X	X	9
39-9032	Recreation Workers					X	X			X	3
Sales and Related (41-0000)											
41-1011	First-Line Supervisors of Retail Sales Workers	X	X	X	X	X	X	X	X	X	9
41-1012	First-Line Supervisors of Non-Retail Sales Workers			X				X			2
41-2021	Counter and Rental Clerks									X	1
41-2022	Parts Salespersons	X	X	X		X	X	X	X	X	8
41-2031	Retail Salespersons									X	1
41-3011	Advertising Sales Agents	X		X	X	X	X	X	X	X	8
41-3021	Insurance Sales Agents	X	X	X	X	X		X	X		7
41-3031	Securities, Commodities, and Financial Services Sales Agents	X			X	X	X	X		X	6
41-3041	Travel Agents				X						1
41-3099	Sales Representatives, Services, All Other	X	X	X	X	X	X	X	X	X	9
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products		X	X						X	3
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products			X		X	X	X		X	5
41-9011	Demonstrators and Product Promoters	X		X					X		3
41-9022	Real Estate Sales Agents	X			X				X		3
41-9041	Telemarketers	X		X	X						3
41-9099	Sales and Related Workers, All Other	X	X	X	X	X		X	X	X	8
Office and Administrative Support (43-0000)											
43-1011	First-Line Supervisors of Office and Administrative Support Workers							X			1
43-2011	Switchboard Operators, Including Answering Service	X			X	X	X		X		5
43-3011	Bill and Account Collectors	X		X	X	X		X	X	X	7
43-3021	Billing and Posting Clerks				X						1
43-3031	Bookkeeping, Accounting, and Auditing Clerks	X			X	X	X		X		5
43-3051	Payroll and Timekeeping Clerks	X		X	X	X			X		5
43-3071	Tellers				X	X	X		X		4

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
43-4051	Customer Service Representatives	X	X	X	X	X	X	X	X	X	9
43-4061	Eligibility Interviewers, Government Programs		X	X							2
43-4071	File Clerks	X			X	X	X		X		5
43-4111	Interviewers, Except Eligibility and Loan	X		X	X	X	X				5
43-4131	Loan Interviewers and Clerks				X	X	X				3
43-4141	New Accounts Clerks					X					1
43-4151	Order Clerks							X		X	2
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	X	X	X	X	X	X	X	X	X	9
43-4171	Receptionists and Information Clerks	X	X		X			X	X	X	6
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks				X						1
43-4199	Information and Record Clerks, All Other			X			X	X			3
43-5011	Cargo and Freight Agents				X	X					2
43-5032	Dispatchers, Except Police, Fire, and Ambulance		X	X							2
43-5061	Production, Planning, and Expediting Clerks		X	X	X		X		X	X	6
43-5071	Shipping, Receiving, and Traffic Clerks	X		X			X		X	X	5
43-5081	Stock Clerks and Order Fillers	X								X	2
43-5111	Weighers, Measurers, Checkers, and Samplers, Recordkeeping		X								1
43-6011	Executive Secretaries and Executive Administrative Assistants	X	X	X	X	X		X	X	X	8
43-6013	Medical Secretaries	X		X	X	X	X	X	X	X	8
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive				X	X				X	3
43-9021	Data Entry Keyers	X	X	X	X	X	X		X	X	8
43-9041	Insurance Claims and Policy Processing Clerks	X					X	X			3
43-9051	Mail Clerks and Mail Machine Operators, Except Postal Service	X			X	X					3
43-9061	Office Clerks, General	X	X	X	X	X	X	X	X	X	9
43-9071	Office Machine Operators, Except Computer							X			1
43-9199	Office and Administrative Support Workers, All Other	X	X	X	X	X	X	X	X		8
Farming, Fishing, and Forestry (45-0000)											
45-1011	First-Line Supervisors of Farming, Fishing, and Forestry Workers		X							X	2
45-2041	Graders and Sorters, Agricultural Products		X							X	2
45-2091	Agricultural Equipment Operators		X				X			X	3

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse			X							1
45-2093	Farmworkers, Farm, Ranch, and Aquacultural Animals		X								1
45-4021	Fallers			X			X			X	3
45-4022	Logging Equipment Operators		X	X			X		X	X	5
Construction and Extraction (47-0000)											
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers	X	X	X	X	X			X		6
47-2021	Brickmasons and Blockmasons			X							1
47-2031	Carpenters	X	X	X	X				X	X	6
47-2051	Cement Masons and Concrete Finishers	X	X	X	X	X	X	X	X	X	9
47-2061	Construction Laborers	X	X		X		X		X		5
47-2071	Paving, Surfacing, and Tamping Equipment Operators	X	X	X			X				4
47-2073	Operating Engineers and Other Construction Equipment Operators	X	X	X	X	X	X	X	X	X	9
47-2111	Electricians	X	X	X	X	X		X	X		7
47-2121	Glaziers					X					1
47-2132	Insulation Workers, Mechanical					X					1
47-2141	Painters, Construction and Maintenance							X	X	X	3
47-2151	Pipelayers		X		X		X		X	X	5
47-2152	Plumbers, Pipefitters, and Steamfitters	X	X	X	X	X	X		X	X	8
47-2181	Roofers		X		X			X			3
47-2211	Sheet Metal Workers	X	X	X	X		X		X	X	7
47-2221	Structural Iron and Steel Workers	X						X	X		3
47-3012	Helpers--Carpenters		X								1
47-3013	Helpers--Electricians	X			X	X	X	X	X	X	7
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters			X	X	X		X		X	5
47-3019	Helpers, Construction Trades, All Other		X							X	2
47-4011	Construction and Building Inspectors							X		X	2
47-4071	Septic Tank Servicers and Sewer Pipe Cleaners		X								1
Installation, Maintenance and Repair (49-0000)											
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers	X		X	X						3
49-2011	Computer, Automated Teller, and Office Machine Repairers						X				1

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49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	X	X	X	X	X	X	X	X		8
49-2098	Security and Fire Alarm Systems Installers	X			X	X			X		4
49-3011	Aircraft Mechanics and Service Technicians	X			X						2
49-3021	Automotive Body and Related Repairers	X			X	X		X	X	X	6
49-3023	Automotive Service Technicians and Mechanics	X	X	X	X		X	X	X	X	8
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	X	X	X	X			X	X		6
49-3041	Farm Equipment Mechanics and Service Technicians		X								1
49-3042	Mobile Heavy Equipment Mechanics, Except Engines		X	X			X			X	4
49-3053	Outdoor Power Equipment and Other Small Engine Mechanics		X				X	X		X	4
49-3092	Recreational Vehicle Service Technicians						X				1
49-3093	Tire Repairers and Changers	X		X	X		X	X	X		6
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers	X	X	X	X	X	X	X		X	8
49-9044	Millwrights			X							1
49-9051	Electrical Power-Line Installers and Repairers				X						1
49-9052	Telecommunications Line Installers and Repairers		X				X				2
49-9071	Maintenance and Repair Workers, General	X	X	X	X	X	X	X	X	X	9
49-9091	Coin, Vending, and Amusement Machine Servicers and Repairers			X							1
49-9098	Helpers--Installation, Maintenance, and Repair Workers	X	X	X		X	X	X	X	X	8
49-9099	Installation, Maintenance, and Repair Workers, All Other							X		X	2
Production (51-0000)											
51-2028	Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers			X		X	X		X		4
51-2091	Fiberglass Laminators and Fabricators								X		1
51-2098	Assemblers and Fabricators, All Other, Including Team Assemblers				X	X		X	X		4
51-3011	Bakers	X	X				X			X	4
51-3021	Butchers and Meat Cutters	X	X	X	X	X	X	X	X	X	9
51-3092	Food Batchmakers		X	X	X			X		X	5
51-3099	Food Processing Workers, All Other		X	X							2
51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	X	X		X				X		4
51-4021	Extruding and Drawing Machine Setters, Operators, and Tenders, Metal and Plastic								X		1

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic			X		X			X		3
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic								X		1
51-4041	Machinists	X		X		X			X		4
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	X		X	X	X	X		X		6
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic			X	X	X			X		4
51-4111	Tool and Die Makers								X		1
51-4121	Welders, Cutters, Solderers, and Brazers	X	X	X	X	X	X	X	X	X	9
51-4193	Plating and Coating Machine Setters, Operators, and Tenders, Metal and Plastic									X	1
51-6031	Sewing Machine Operators						X				1
51-6062	Textile Cutting Machine Setters, Operators, and Tenders	X							X		2
51-6093	Upholsterers								X		1
51-7011	Cabinetmakers and Bench Carpenters	X	X	X				X		X	5
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood	X	X				X	X		X	5
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing	X	X				X			X	4
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders			X							1
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	X	X	X	X	X	X		X	X	8
51-9081	Dental Laboratory Technicians							X			1
51-9111	Packaging and Filling Machine Operators and Tenders	X	X	X	X	X	X	X	X	X	9
51-9121	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders		X	X						X	3
51-9192	Cleaning, Washing, and Metal Pickling Equipment Operators and Tenders									X	1
51-9195	Molders, Shapers, and Casters, Except Metal and Plastic	X					X				2
51-9197	Tire Builders			X							1
51-9198	Helpers--Production Workers	X		X				X	X	X	5
51-9199	Production Workers, All Other	X	X	X	X	X	X	X	X	X	9
Transportation and Material Moving (53-0000)											
53-1048	First-line Supervisors of Transportation and Material Moving Workers, Except Aircraft Cargo Handling Supervisors	X	X	X	X		X	X	X	X	8
53-3021	Bus Drivers, Transit and Intercity							X		X	2
53-3022	Bus Drivers, School or Special Client	X									1

SOC Code	Occupation	East	Northwest	Southern Middle	Northern Middle	Greater Memphis	Southwest	Northeast	Southeast	Upper Cumberland	Number of Regions
53-3031	Driver/Sales Workers			X						X	2
53-3032	Heavy and Tractor-Trailer Truck Drivers	X	X	X	X			X	X	X	7
53-3033	Light Truck or Delivery Services Drivers	X	X	X	X	X		X	X	X	8
53-6031	Automotive and Watercraft Service Attendants		X								1
53-7011	Conveyor Operators and Tenders		X				X				2
53-7032	Excavating and Loading Machine and Dragline Operators				X			X	X		3
53-7051	Industrial Truck and Tractor Operators	X	X	X	X	X	X	X	X	X	9
53-7061	Cleaners of Vehicles and Equipment			X							1
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	X	X	X	X	X	X	X	X	X	9
53-7063	Machine Feeders and Offbearers			X			X		X	X	4
53-7064	Packers and Packagers, Hand			X							1
53-7081	Refuse and Recyclable Material Collectors		X		X			X	X		4

Source: TNECD, 2018 LEAP Report

