

ACADEMIC SUPPLY FOR OCCUPATIONAL DEMAND REPORT

2024

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Executive Summary

The *Improving the Pipeline for Tennessee's Workforce: Academic Supply for Occupational Demand Report* is a joint report between the Tennessee Higher Education Commission (THEC), Tennessee Department of Labor and Workforce Development (TDLWD), Tennessee Department of Economic and Community Development (TNECD), and Tennessee Department of Education (TDOE). The Department of Finance and Administration's Office of Evidence and Impact (OEI) supports this project by linking K12 and postsecondary graduates to employment data in P20 Connect.

This year's report maintains the Career Cluster structure, grouping occupations and aligned training programs in one place. Accompanying dashboards and data downloads are also available for readers who prefer to work with the data directly.

Multiple state agencies facilitate this report's completion and there are many audiences for this report. Each year, efforts to refine and improve the report and associated outputs will continue to ensure the report is useful in education and workforce planning.

This Report:

- Identifies in-demand occupations and aligned academic programs at the postsecondary and secondary levels and registered apprenticeships organized across 14 career clusters.
- Includes in-demand occupations tables identifying the region(s) where the occupation is in-demand, entry level wages, indicators for jobs which are in STEM fields and those which support TNECD's target industries, and the typical training level required for employment.
- Contains aligned academic programs tables with information about degree production and completers, matriculation into Tennessee's job market, and first-year wages for those identified in Tennessee employment data.
- Captures select agency initiatives promoting education and workforce alignment in K12, higher education, and the workforce.

In-Demand Occupations and Aligned Academic Program Highlights

The Tennessee Department of Labor and Workforce Development (TDLWD) has established a threshold to identify where there is demand for trained individuals but few or no aligned training programs. This section identifies academic programs where Tennessee employment rates are 60 percent or higher¹ and confer wages exceeding the state median wage of \$39,929 in 2022. These indicators signal greater labor force needs.

Each cluster has the total number of in-demand occupations and the total number of aligned academic programs, which includes postsecondary programs at each degree level, high school CTE programs, and apprenticeships.



Agriculture, Food, and Natural Resources

14 In-Demand Occupations | 33 Aligned Academic Programs

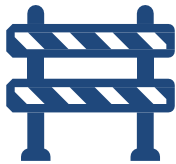
Veterinarians are **in demand** in two regions in Tennessee. In 2021-22, 84 Doctor of Veterinary Medicine (DVM) degrees were granted with estimated first-year wages of \$97,618, outpacing other graduates in this cluster. Nearly half of DVM graduates (45 percent) are working in the state, a larger share than in the previous year. Occupations in-demand in more than four regions in the state include supervisors of landscaping workers, landscaping workers, and veterinary technologists/technicians.

Supply: The Environmental and Natural Resources Policy master's degree program had the second highest salaries in this cluster. Several programs had high employment rates, including bachelor's degree programs in environment and natural resources management and policy (85 percent), veterinary sciences (66 percent), and environmental studies (74 percent). Veterinary technology/technician programs at the associate degree (80 percent) and one-to two- year certificate (75 percent) level also had high rates of employment. High school CTE programs in agribusiness, food technology and processing and horticulture

¹ Employment data comes from Tennessee's Unemployment Insurance (UI) records which do not capture individuals who are not covered in UI data or who work out of state.

science had more than half their concentrators employed in Tennessee with wages higher than the state median wage.

Unmet needs: Across the state, needs exist for veterinary technologists and technicians and landscaping supervisors.



Architecture and Construction

27 In-Demand Occupations | 38 Aligned Academic Programs

With Tennessee's economy continuing its growth and with historically low unemployment rates, architecture and construction workers across the board are **in-demand**. Of the 27 occupations identified, 10 are in-demand in six of nine local workforce development areas (LWDAs).

Supply: Of all clusters, program completers in this cluster have some of the highest rates of employment in Tennessee. Eleven of the 18 postsecondary programs have employment rates of 60 percent or more, with six programs exceeding 70 percent. The highest employment rates are for the 1–2-year certificate programs for HVAC (75 percent), electrician (73 percent), and electrical and power transmission installation/installers (72 percent).

Other programs meeting the **unmet need** criteria in this cluster are electrician (<1 year certificate) and plumbing technology (1-2-year certificate). Meeting this workforce challenge is complicated by the low entry level wages. Only five in-demand occupations in this cluster have wages exceeding the state median: telecommunications line installers, plumbers, brick and block masons, and construction managers and supervisors.



Manufacturing

48 In-Demand Occupations | 37 Aligned Academic Programs

There are 48 manufacturing occupations identified as **in-demand**. There are several occupations in-demand in eight or more LWDAs, but only one confers a typical entry level wage more than the state median, first line supervisors of production and operating workers. All in-demand occupations in this cluster except coating, painting, and spraying workers require a high school education or the equivalent corresponding with wage levels below the state median.

Fifteen postsecondary programs with 10 or more completers **addressed training needs** for in-demand occupations in the manufacturing sector and all but three had rates of employment in Tennessee greater than 60 percent. The bachelor's degree in electromechanical engineering technology/technician (\$74,667) and 1-2-year certificate completers in industrial mechanics and maintenance technology (\$57,663) had high wages in this cluster. Nine aligned academic programs meet the **unmet need** criteria, including: industrial electronics technician (1-2-year certificates), industrial mechanics, maintenance workers (<1 year and 1-2-year certificates), and operations maintenance and supervision (<1 year certificate).



Transportation

18 In-Demand Occupations | 20 Aligned Academic Programs

Tennessee is a leading state in transportation, distribution, and logistics, and the need for additional workers is widespread. Of the 18 **in-demand** occupations, half are in demand in eight or nine of the LWDAs. Typical educational training requirements for occupations in this cluster are high school or the equivalent. Occupations requiring additional training include automotive service technicians and mechanics and heavy and tractor-trailer truck drivers.

Supply: The master’s degree in supply chain management confers the highest wages for aligned programs in this cluster (\$90,629). <1-year and 1-2-year certificate programs in this cluster had employment rates of 60 percent or more. Postsecondary supply in this cluster is supported by 2,592 high school CTE concentrators and 40 apprenticeship completers. High school CTE programs in automobile mechanics and autobody collision and repairs had higher median wages than postsecondary certificate programs. Additional workers with high school level training only are needed in the Transportation cluster.

Several programs meeting the **unmet need** criteria include short-term certificate programs for diesel mechanics, truck and bus drivers, and logistics, materials, and supply chain management.



Business, Finance and Government Management and Support Services

50 In-Demand Occupations | **135** Aligned Academic Programs

Of the 50 occupations **in demand** in this cluster, 11 are in demand in all nine of Tennessee’s LWDA’s. There are 128 postsecondary, five high school CTE, and two apprenticeship programs to **supply** these occupational needs. Multiple in-demand occupations are supported by programs that meet **unmet need** thresholds, including general and operations managers, human resources managers, management analysts and market research analysts, accountants and auditors, bookkeeping, accounting, and auditing clerks, customer service representatives, and human resources assistants.



Sales and Marketing

16 In-Demand Occupations | 11 Aligned Academic Programs

There are five occupations **in-demand** in seven or more LWDAs and only one, sales managers and technical sales representatives, requires a bachelor's degree; the others typically require a high school degree only. Eight postsecondary, two high school CTE programs, and one new apprenticeship program provided **training** for these occupations. Notably, high school CTE concentrators found in Tennessee employment data were earning first-year wages comparable to the state median.

The bachelor's degree in marketing/marketing management which provides training for sales managers and the e-commerce master's degree program met **unmet need** criteria with high Tennessee employment rates and wages above the state median.



Health Sciences

28 In-Demand Occupations | 81 Aligned Academic Programs

Healthcare and social assistance is expected to be the largest industry in Tennessee by 2030, with employment of healthcare practitioners and support workers expected to increase by more than 63,500.² Of the 28 **in-demand** occupations in Tennessee's LWDAs, six were in demand in eight or more areas. There are significant shortages of registered nurses, as measured by job openings, though there is not in evidence across all LWDAs which may be a limitation of our methodologies. Typical training levels for in-demand occupations in the Health Sciences cluster include bachelor's and higher, postsecondary nondegree awards, and associate or high school degrees.

There are many aligned academic programs **supplying** in-demand health sciences occupations. Completers in the health sciences have some of the highest employment rates

² Tennessee Department of Labor and Workforce Development. Tennessee's Economy, 2022-2023, p. 15.

of any career cluster. Licensed practical nurses (LPNs) graduated from 1-2-year certificate programs with employment rates of 77 percent and median wages of \$47,280; physical therapist assistants in associate degree programs had employment rates of 81 percent and median wages of \$42,700. LPNs and physical therapy assistants are **needed** in all LWDAs. There are several programs that meet unmet need criteria and more information can be found in the aligned academic supply tables.



Human Services

11 In-Demand Occupations | 62 Aligned Academic Programs

In Tennessee, employment in community and social service occupations is projected to grow by nearly 8,000 jobs from 2020 to 2030 and personal service jobs are expected to grow by nearly 25,000.³ The pandemic shed new light on the need to expand behavioral health for adults and children. Social and human services assistants, requiring a high school degree, are **in-demand** in seven of the nine regions of Tennessee. Healthcare social workers and educational, guidance, and career counselors and advisors are in-demand in six regions.

A total of 62 postsecondary programs **provide training** related to in-demand occupations in the human services cluster, including the high school CTE program in human development and family studies and the certificate program in substance abuse and addiction counseling. Few postsecondary programs in this cluster have high placement and wages above the state median. The cosmetology certificate programs have employment just over 50 percent, but median wages are low; high school CTE median wages for cosmetology are nearly twice as high as those of the certificate programs.

Education and career counselors' programs meet the **unmet need** threshold and are available at the master's (69 percent employed, \$48,510 annual median wage) and education specialist (77 percent employed, \$46,295 median wage) degree levels. Social workers have master's degree and post-baccalaureate certificate programs available, with employment rates of 62 percent or more and wages above the state median. The family and community services post-baccalaureate certificate program has the highest employment rate of all aligned academic programs in the cluster.

³ Tennessee Department of Labor and Workforce Development. Tennessee's Economy, 2022-2023, p. 15.



Education and Training

7 In-Demand Occupations | 73 Aligned Academic Programs

The education and training career cluster includes educators, administrators, librarians, counselors, and other learning support services as **in-demand** in Tennessee. Successful teacher recruitment and retention are essential for a high-quality education workforce; however, teacher shortages remain a challenge. The limitations of the report's current methodology led to an underestimation of the demand for teachers, and therefore, some teacher positions are not listed as an in-demand occupations in the report. Preschool teachers are in demand in four areas of the state.

Childcare challenges are currently impacting workforce participation in the state and the nation. A recent study in one state found that 28 percent of those surveyed said “they or someone in their household has left a job, not taken a job, or greatly changed jobs because of problems with childcare in the last 12 months.”⁴

Tennessee’s teacher apprenticeship program is a new and innovative way to improve the **supply** of Tennesseans in the teaching profession. The program had 28 completers in 2022. Several aligned academic programs in this cluster meet **unmet need** criteria, including the bachelor’s degree in early childhood education which had an employment rate of 74 percent and median pay of nearly \$43,000. The master’s degree program in library and information science had an employment rate of 54 percent and a first-year median wage of \$50,180.

⁴ Missouri Chamber of Commerce, Nov. 30, 2021. [New Research Shows Missouri Loses \\$1.35 Billion in Annual Economic Opportunity Due to Childcare Gaps - Missouri Chamber \(mochamber.com\)](https://www.mochamber.com/news/new-research-shows-missouri-loses-1.35-billion-in-annual-economic-opportunity-due-to-childcare-gaps)



Protective Services and Law

3 In-Demand Occupations | 15 Aligned Academic Programs

The protective services and law cluster includes occupations focused on providing legal, public safety, and protective services. Corrections officers and jailers and security guards are **in demand** in three regions of the state.

Supply for these occupations typically requires a high school degree or the equivalent. High school CTE programs across the state had 2,575 concentrators in corrections; 52 percent of them obtained employment at wages about \$1,000 less than the state median wage. There are hundreds of vacancies for correctional officers in the state that could be filled with high school concentrators in the corrections program.

Programs with employment rates of 60 percent or more and earnings greater than the state median wage, considered **unmet need**, included the master's degree program in criminal justice/law enforcement administration, and the <1-year certificate and the associate degree program in criminal justice/police science.



Arts and Communications

8 In-Demand Occupations | 73 Aligned Academic Programs

The Arts & Economic Prosperity 5 Study finds the nonprofits arts and culture sector is a \$1.17 billion industry in Tennessee, supporting over 38,000 full-time equivalent jobs. **In-demand** occupations in three or more areas include graphic designers, printing press operators, and editors.

The program **supplying** graphics design at the bachelor's degree level had an employment rate of 56 percent and salary less than the state median. Editors can work in a variety of fields and the bachelor's degree in journalism had an employment rate of more than 60 percent and wages below \$35,000.

Higher rates of pay could induce more individuals into these occupations. Just two programs met the **unmet need** criteria: the master's degree in mass communication and the post-baccalaureate certificate in educational and instructional technology. Individuals with education technology skills are increasingly in demand as online learning has expanded at the elementary, secondary, and postsecondary levels.



Leisure and Recreation

13 In-Demand Occupations | 29 Aligned Academic Programs

In Tennessee, the arts, entertainment, and recreation industries are expected to have five percent annual growth from 2020 to 2030, while accommodation and food services employment will grow by three percent.⁵ Most of the **in-demand** occupations in the leisure and recreation cluster require only a high school degree or the equivalent. Food service managers, supervisors of housekeeping and janitorial workers, exercise trainers, and pest control workers are in-demand in all LWDAs in the state. Chefs and head cooks, coaches and scouts, and food service supervisors are in-demand in seven areas.

There are training opportunities to **supply** these in-demand occupations, though wages are low for program completers. Culinary arts/chef training is available at the associate degree and certificate level, as well as high school CTE and apprenticeship levels. Employment rates for all are above 60 percent.

The situation is similar with the hotel/motel management programs. Without increasing wages or developing pathway opportunities, vacancies for food service managers and supervisors, chefs and head cooks, and housekeeping supervisors will likely remain **unmet**. Pest control workers are needed in all nine LWDAs and may require training programs to increase the workforce.

⁵ Tennessee Department of Labor and Workforce Development, WIRED, Long Term Industry Projections 2020-2030



Information Technology

11 In-Demand Occupations | 40 Aligned Academic Programs

Information technology (IT) occupations are **in demand** in Tennessee and across the nation. IT occupations are projected to grow 2.9 percent annually from 2020 to 2030, faster than the average for all occupations.⁶ The most in-demand IT occupations include computer user support specialists, computer network support specialists, computer systems analysts, information security analysts, and software developers. Computer user and network support specialists usually require some college but less than a bachelor's degree, while the other occupations usually require a bachelor's degree.

Forty programs ranging from apprenticeships to doctoral degrees **provide training** for these occupations. Certificate programs (1-2-year) in information technology (93 percent) and System, Networking, and LAN/WAN management (95 percent) have the highest share of their graduates found employed in Tennessee. While short term trends have shown some volatility, IT employment is expected to have strong growth long term.

There are several aligned academic programs meeting **unmet need** criteria, including the post-baccalaureate certificate in medical informatics, bachelor's degree for computer systems analysts and computer and information sciences, the associate degree in information technology, and certificates for information security analysts and computer systems networking and telecommunications.

⁶ Tennessee Department of Labor and Workforce Development, WIRED, Long Term Industry Projections 2020-2030



Engineering and Other STEM Programs

15 In-Demand Occupations | 103 Aligned Academic Programs

Engineering and related occupations play an instrumental role in Tennessee businesses and are connected to several of TNECD's target industries. The occupations that are **in-demand** in the most regions of Tennessee are electrical and electronic engineering technologists and technicians, electrical, industrial, and mechanical engineers, and architectural and civil drafters. Engineers require a bachelor's degree, while the technologists, technicians, and drafters require associate degrees. The electrical and electronics engineering and mechanical engineering bachelor's degree programs had employment rates of more than 50 percent and wages over \$70,000.

Several aligned academic programs in the Engineering and Other STEM cluster met the qualifications for **unmet needs**. Tennessee employers hired 66 percent of graduates from the master's degree program in industrial engineering with first-year wages of \$106,816. More than 72 percent of completers in electrical, electronic, and communications engineering technology programs were found in Tennessee employment data with wages above the state median. Multiple additional programs have 60 percent or more graduates employed in Tennessee making greater first-year wages than the Tennessee median, including drafting and design technology, mechatronics, robotics, and automation engineering (bachelor's), and civil engineering (bachelor's), among others.

Introduction

This report is prepared pursuant to Tennessee Code Annotated § 49-7-112(b), which directs the Tennessee Higher Education Commission (THEC), in partnership with the Tennessee Department of Labor and Workforce Development (TDLWD), Tennessee Department of Economic and Community Development (TNECD), and Tennessee Department of Education (TDOE), to “produce an annual report regarding state workforce need projections and credential production.” While each agency has a distinct mission, all have connected goals in preparing Tennesseans for careers and building the talent pipeline of Tennessee’s workforce.

In-demand occupations and aligned academic programs — including postsecondary degrees, high school career and technical education (CTE) concentrators, and apprenticeships — are organized by career cluster in this report. Accompanying dashboards and workbooks localize this information by local workforce development area.



The Tennessee Department of Education's (TDOE) mission is *to set all students on a path to success*. As part of this vision, TDOE seeks to increase the number of students on-track to meet their postsecondary goals. 43.3 percent of the class of 2023 were Ready Graduates, which are the share of graduating students who demonstrate readiness for postsecondary education and/or a career after high school. There are several criteria to be a Ready Graduate, including a qualifying ACT score, and participation in early postsecondary opportunities (EPSOs), among other criteria. The State Board of Education's (SBOE) Master Plan outlines the goal to **increase the share of Ready Graduates by 4 percentage points annually**.



The Tennessee Higher Education Commission (THEC) and Tennessee Student Assistance Corporation (TSAC) are *relentlessly focused on increasing the number of Tennesseans with a postsecondary credential*. **The goal is to have 55 percent of Tennesseans earn a postsecondary credential by 2025**, which is informed by estimates of workforce need. To meet this goal, THEC/TSAC promotes college access, offers financial aid programs, approves academic programs offered by public colleges, funds colleges through an outcomes-based funding model, and guides local workforce alignment efforts through the Governor's Investment and Vocational Education Act (GIVE).



The mission of the Tennessee Department of Labor and Workforce Development (TDLWD) is to *work as a team to promote workforce and economic development and improve workplace safety and health throughout Tennessee*. TDLWD oversees several functions to promote training and employment for individuals to increase family-sustaining wages, meet employer demand, and enhance productivity and competitiveness in Tennessee. This is done through a high-quality workforce development system, aligning workforce investment, education, and economic development. TDLWD seeks **to increase the Labor Force Participation rate to 65 percent by 2025**. As of September 2023, Tennessee's Labor Force Participation rate was 59.4 percent.

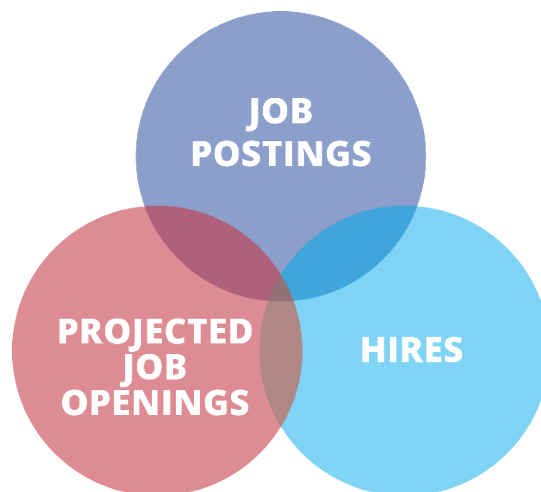


The Tennessee Department of Economic and Community Development (TNECD)'s mission is to *enhance Tennessee's competitiveness by driving job creation, generating economic growth, and facilitating community development*. As part of this mission, TNECD seeks **to be the number one state in the southeast for high quality jobs** and supports the state's efforts to attract and grow business in the state for job growth and economic vitality. A core goal to their Strategic Plan is to support companies and education stakeholders in closing workforce gaps.

In-Demand Occupations and Aligned Academic Supply

This section captures the 2024 in-demand occupations across Tennessee and the aligned secondary and postsecondary academic programs. An **in-demand occupation** is a job that Tennessee employers have a high demand to fill. An occupation is measured as in-demand when two of three measures of demand (job postings, projected job openings, and hires) are above the median relative to other occupations within the region.

Measures for In-Demand Occupational Analysis



An **aligned academic program**⁷ is a training program preparing students for careers in an in-demand occupation. The skills and knowledge developed through completion of an aligned academic program are matched with the skills and knowledge required for success in an occupation. These matches are informed by the career clusters framework which organizes occupations and training programs providing common pathways for prospective students to occupations (and vice versa).^{8,9,10}

⁷ This report includes registered apprenticeships, high school CTE completers, and postsecondary degree completers in data for aligned academic programs. There are other training initiatives, like industry certifications, that are not currently captured.

⁸ For more information see Advance CTE's website explaining the 16 National Career Clusters Framework [here](#).

⁹ Tennessee Department of Education's Career Cluster Framework can be found [here](#).

¹⁰ This year's report combines Business, Finance, Government and Support Services into one cluster and Sales and Marketing into one cluster resulting in 14 career clusters.

The Tennessee Department of Labor and Workforce Development (TDLWD) uses a crosswalk to link 2020 Classification of Instructional Programs (CIP)¹¹ to the 2018 Standard Occupational Classification (SOC)^{12, 13} via the career cluster. The universe of CIP and SOC codes are linked to a career cluster, which TDLWD uses to identify aligned academic programs associated with in-demand occupations. The career clusters were developed in alignment with the 16 TDOE career clusters. They have been updated over the years in consultation with Tennessee educators at the secondary and postsecondary levels and to incorporate code changes in SOC and CIP codes. Tennessee's Department of Finance and Administration's Office of Evidence and Impact (OEI) analyzes the aligned academic programs for public and select private postsecondary completers¹⁴, secondary concentrators¹⁵, and employment outcomes captured in this report.

¹¹ The [Classification of Instructional Programs \(CIP\)](#) is a taxonomic scheme that supports the accurate tracking and reporting of fields of study and program completions activity.

¹² The [Standard Occupational Classification \(SOC\)](#) is a federal statistical standard used by federal agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data.

¹³ More information about BLS and NCES CIP to SOC Crosswalk can be found [here](#). This year's report reflects the updated 2020 CIP codes and 2018 SOC codes.

¹⁴ Select Tennessee Independent Colleges and Universities Association (TICUA) institutions report to P20 Connect and those completers and their associated job market outcomes are included.

¹⁵ For purposes of this report, high school CTE concentrators reflect a student completing two course credits within a CTE program of study.

How to Read Tables in this Section

Occupations have been grouped throughout this report based on their career clusters, which are groupings of occupations and their connected training programs. Each career cluster has a table of the in-demand occupations and tables with the aligned academic program supply.¹⁶ For most career clusters, there are multiple tables showing academic program supply, including postsecondary degree completers, high school CTE concentrators, and registered apprenticeships.

Cluster One: [Agriculture, Food, and Natural Resources](#)

Cluster Two: [Architecture and Construction](#)

Cluster Three: [Manufacturing](#)

Cluster Four: [Transportation](#)

Cluster Five: [Business, Finance and Government Management and Support Services](#)

Cluster Six: [Sales and Marketing](#)

Cluster Seven: [Health Sciences](#)

Cluster Eight: [Human Services](#)

Cluster Nine: [Education and Training](#)

Cluster Ten: [Protective Services and Law](#)

Cluster Eleven: [Arts and Communication](#)

Cluster Twelve: [Leisure and Recreation](#)

Cluster Thirteen: [Information Technology](#)

Cluster Fourteen: [Engineering and Other STEM](#)

¹⁶ For purposes of this report, each occupation is categorized into only one cluster. In practice an occupation may be relevant to additional career clusters.

The in-demand occupations tables highlight occupations in TNECD’s target industry clusters.¹⁷ TNECD has nine prioritized clusters for business expansion and recruitment. TNECD configures its incentives to support specific business segments, systematically chosen to align with the state’s distinctive economic competencies. This strategic alignment is designed to stimulate job creation and foster investment in industries where Tennessee exhibits a competitive advantage.¹⁸

TNECD Target Industry Sectors		
Aerospace & Defense	Automotive	Chemicals
Distribution & Logistics	Electrical Equipment & Appliances	Food & Agriculture
Healthcare & Life Sciences	HQ, Finance & Tech	Rubber, Ceramics & Glass Products

The tables for in-demand occupations and aligned academic supply are referenced below by column to help the reader quickly learn more about the occupation.

¹⁷ More information on each target industry sector is available at <https://tnecd.com/>.

¹⁸ TNECD, “[Open ECD Tax Incentives](#)”, Transparent TN

In-Demand Occupation Table Legend:

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				

The six-digit code denotes the Standard Occupational Classification (SOC) Code for the in-demand occupation.

Occupation is the name of the in-demand job.

The median entry-level yearly wage for employees in an occupation as of FYY2022.

Two columns indicate the region(s) in which the position is in-demand:

- In the column named "TN", an "X" denotes that an occupation was in-demand statewide.
- In the column named "Total # Regions", a number from one to nine indicates the number of regions in which the occupation was found to be in-demand.²⁰

The typical entry-level education requirement represents the typical education level most workers need to enter an occupation, as assigned by the U.S. Bureau of Labor Statistics.²¹

A "#" denotes the occupation is a STEM occupation^{1,9}.

A "*" denotes the occupation is important to one or more of TNECD's target industry sectors.

¹⁹ TNECD and TDLWD use the U.S. BLS definition for Science, Technology, Engineering, and Math (STEM). More information about this definition can be found [here](#): U.S. Bureau of Labor Statistics, Additional OEWS data sets, STEM data, May 2021 (XLS).

²⁰ There are nine Local Workforce Development Areas (LWDAs), or regions, composed of groups of counties within Tennessee. An occupation with a "9" indicates that the occupation was found to be in-demand for each of the nine LWDAs, or regions, within the state.

²¹ More information about education training levels in BLS data can be found [here](#).

Academic Supply Table Legend:

For Postsecondary Completers:

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
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The six-digit code denotes the Classification of Instructional Program (CIP Code) for the academic program.²²

Program Title is the name of the academic program.

Education Award Level represents the degree level completed. Degree levels include less than one-year certificates (C<1YR), one-to-two-year certificates (C1-2YR), associate (AA), bachelor's (BA), post-baccalaureate certificates (CPBA), master's (MA), education specialists (EDS), doctoral (D), and professional degrees (P).²³

The Number of Graduates from 2021-22 by CIP code and degree level. Cells less than ten are suppressed.

Share of Graduates Employed in Tennessee represents the percentage of graduates found in two quarters of Tennessee's Unemployment Insurance (UI) records two quarters after graduation. This excludes individuals who remain enrolled in education.

Estimated First Year Annual Wages of Graduates Employed in Tennessee denotes the estimated first year average annual wages of graduates found in UI data. Two quarters of wages are pulled two quarters after graduation and are calculated by multiplying the sum of quarterly wages by two then finding the median.

For High School CTE Concentrators:

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
----------	---------------	-------------------	-----------------	------------------	----------------------------------

The six-digit code denotes the Classification of Instructional Program (CIP Code) assigned to the High School CTE Program.

Same as above.

Education Award Level will be CTE HS program.

Number of Grads represents the number of high school graduates who completed two or more courses in a CTE program of study a career cluster (HS CTE Concentrator). This data reflects completers from 2021-22.

Same as above.

Same as above.

For Federal Registered Apprenticeship Completers:

CIP Code	Program Title	Number of Completers 2022
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Same as above.

Program Title is the name of the Registered Apprenticeship program.

The number of Registered Apprenticeship completers in 2022.

²² More information about CIP codes can be found [here](#).

²³ TCAT diplomas are captured within the certificate degree level.

Cluster One: Agriculture, Food, and Natural Resources Occupations

In 2022, farming operations occupied approximately 40 percent of the state’s nearly 27 million acres of land area. Farming generated \$5.2 billion in cash receipts during 2022, with 59.2 percent of this value coming from crops and 40.8 percent from animals and animal products. Tennessee has approximately 69,500 farming operations, ranking the eighth highest in the U.S.²⁴

Tennessee has an estimated 8.47 billion live trees²⁵ and 14 million acres in forest.²⁶ Logging equipment operators supply raw materials to companies needing wood and forest products for manufacture.

Veterinarians and veterinary technologists and technicians provide essential services for the health and safety of Tennessee’s animals and animal products.

Employment opportunities in agriculture, food, and natural resources have expanded in recent years. Since 2018, there have been approximately 50 projects announced, more than 5,400 new jobs and more than \$2 billion in capital investment.²⁷

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
19-2041	Environmental Scientists and Specialists, Including Health		2	\$48,769	Bachelor's degree	*	#
19-4021	Biological Technicians	X	2	\$36,456	Bachelor's degree	*	#
29-1131	Veterinarians		2	\$71,536	Doctoral or professional degree		
29-2056	Veterinary Technologists and Technicians	X	4	\$27,785	Associate degree		

²⁴ An [Economic Report to the Governor of Tennessee](#), 2024, page 51

²⁵ United States Department of Agriculture, [EVALIDator \(Data Retrieval Tool for Tree Population Estimates\)](#)

²⁶ Tennessee Department of Agriculture, [Forestry](#)

²⁷ Tennessee Department of Economic and Community Development, Food and Agriculture [webpage](#)

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	X	7	\$35,497	High school diploma or equivalent		
37-3011	Landscaping and Groundskeeping Workers	X	4	\$26,448	No formal educational credential		
37-3012	Pesticide Handlers, Sprayers, and Applicators, Vegetation		1	\$28,359	High school diploma or equivalent		
37-3013	Tree Trimmers and Pruners		2	\$36,081	High school diploma or equivalent		
45-2091	Agricultural Equipment Operators		1	\$29,493	No formal educational credential		
45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse		1	\$27,585	No formal educational credential	*	
45-4022	Logging Equipment Operators		2	\$35,389	High school diploma or equivalent		
51-3093	Food Cooking Machine Operators and Tenders		3	\$30,632	High school diploma or equivalent	*	
51-8031	Water and Wastewater Treatment Plant and System Operators		2	\$32,884	High school diploma or equivalent		
53-7081	Refuse and Recyclable Material Collectors		3	\$21,842	No formal educational credential		

Agriculture, Food, and Natural Resources Aligned Academic Programs

Postsecondary Agriculture, Food, and Natural Resources Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
01.0101	Agricultural Business and Management, General.	BA	13	38%	\$34,083
01.0101	Agricultural Business and Management, General.	MA	*	*	*
01.0102	Agribusiness/Agricultural Business Operations.	BA	106	62%	\$39,974
01.0307	Horse Husbandry/Equine Science and Management.	BA	*	*	*
01.0307	Horse Husbandry/Equine Science and Management.	MA	*	*	*
01.0504	Dog/Pet/Animal Grooming.	C < 1 YR	*	*	*
01.0605	Landscaping and Groundskeeping.	C < 1 YR	*	*	*
01.8001	Veterinary Medicine.	P	84	45%	\$97,618
01.8101	Veterinary Sciences/Veterinary Clinical Sciences, General.	BA	38	66%	\$29,451
01.8301	Veterinary/Animal Health Technology/Technician and Veterinary Assistant.	C < 1 YR	*	*	*
01.8301	Veterinary/Animal Health Technology/Technician and Veterinary Assistant.	C 1-2 YR	16	75%	\$30,273
01.8301	Veterinary/Animal Health Technology/Technician and Veterinary Assistant.	AA	49	80%	\$31,284
03.0101	Natural Resources/Conservation, General.	D	*	*	*
03.0103	Environmental Studies.	BA	19	74%	\$40,702
03.0103	Environmental Studies.	D	*	*	*
03.0104	Environmental Science.	BA	65	57%	\$32,614
03.0104	Environmental Science.	CPBA	*	*	*
03.0104	Environmental Science.	MA	15	47%	\$39,000
03.0201	Environmental/Natural Resources Management and Policy, General.	BA	26	85%	\$33,688
03.0204	Environmental/Natural Resource Economics.	BA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
03.0207	Environmental/Natural Resource Recreation and Tourism.	BA	*	*	*
03.0299	Environmental/Natural Resources Management and Policy, Other.	MA	15	53%	\$54,316
03.0501	Forestry, General.	BA	25	48%	\$32,785
03.0501	Forestry, General.	MA	*	*	*
15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician.	AA	*	*	*
26.1201	Biotechnology.	AA	*	*	*
26.1307	Conservation Biology.	BA	*	*	*
30.3301	Sustainability Studies.	CPBA	*	*	*
30.3301	Sustainability Studies.	BA	15	40%	\$31,341

Tennessee colleges offer an array of academic programs to support in-demand occupations in the Agriculture, Food, and Natural Resources Cluster. Agriculture and farming are major parts of Tennessee’s economy and that is evidenced through the programs offered across the state. Tennessee Tech University (TTU) offers a program in Environmental and Sustainability Studies (CIP 03.0103) with 7 timely concentrations, including Environmental Leadership, Environmental Sustainability, and Environmental Technology, among others.

TCAT Hohenwald is taking steps to ensure a strong future workforce for the forestry and agriculture industries in Southern Middle Tennessee. With GIVE 2.0 funding, TCAT Hohenwald is developing pathways and creating opportunities for secondary and postsecondary students to gain the skills needed for a capable workforce in the region.

High School CTE Agriculture, Food, and Natural Resources Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
01.0102	Agribusiness/Agricultural Business Operations.	CTE HS	223	55%	\$43,373
01.1002	Food Technology and Processing	CTE HS	68	53%	\$43,584
01.1103	Horticulture Science	CTE HS	1,639	50%	\$40,206
01.8301	Veterinary/Animal Health Technology/Technician and Veterinary Assistant.	CTE HS	2,508	51%	\$38,365

Over half of 2021-22 high school graduate concentrators in agribusiness and food technology were found in Tennessee’s labor market making wages greater than the state median. Agriculture, Food, and Natural Resources is the second most popular career cluster in Tennessee high schools with over 13,000 concentrators enrolled in the 2022-23 school year. The Alvin C. York Agricultural Institute in Jamestown, TN is a high school program that provides students hands-on learning on a working farm, including livestock and row crop experiences. In 2024-25, Meat Science will be introduced as a new program of study to prepare students for careers in food technology and processing.

Agriculture, Food, and Natural Resources Apprenticeship Completers, 2021-22

CIP Code	Program Title	Number of Completers 2022
15.0506	Water Quality and Wastewater Treatment Management and Recycling Technology/Technician.	*

Governor's Investment in Vocational Education (GIVE) TCAT Hohenwald

The Governor's Investment in Vocational Education (GIVE) program aims to create long-term partnerships between Tennessee Colleges of Applied Technology (TCATs), community colleges, industries, economic development/workforce agencies, and K-12 schools. Its main goal is to identify and address the "skills gaps" present in the local workforce. GIVE is a competitive grant that awards of up to \$1 million to local higher education entities to facilitate collaboration between K12, higher education, and workforce partners.

With funding from GIVE 2.0, TCAT Hohenwald is providing more workforce training opportunities in South Central Tennessee, with an emphasis on Forestry and Agriculture. As a result, secondary schools in Hickman, Maury, Lewis, and Wayne County can now offer their students dual enrollment opportunities in Forestry and Agricultural Technology. Dual enrollment numbers increased in spring 2023 from twenty (20) to one hundred (100) in fall 2023. Students can also earn industry credentials, such as OSHA 10, while enrolled in the dual enrollment program. Post-secondary students now have access to a newly renovated facility with state-of-the-art equipment and expert trainers to help enhance their training. Nine (9) students are currently working towards completing their Forest Worker Certificate, which is available through the Tennessee Forestry Association.

Cluster Two: Architecture and Construction Occupations

Occupations in architecture and construction need skilled workers that design, plan, manage, build, and maintain structures. Tennessee’s position as a top state to do business has generated economic development successes, which in turn create jobs in architecture and construction.

Several occupations in this group are in-demand statewide, and skilled workers are needed in every region or nearly every region across the state. Construction managers, cost estimators, and interior designers typically require four-year degrees, while most other occupations in this group acquire skills through a two-year degree, postsecondary certificate, apprenticeship, or on-the-job training.

Many of the in-demand occupations in the construction trades are tied to residential and commercial construction. The need to build new housing across the state requires skilled tradespeople to fill that workforce. This includes construction managers, carpenters, cement masons and concrete finishers, construction laborers, operating engineers and other construction equipment operators, painters, plumbers, roofers and heating, air conditioning, and refrigeration mechanics and installers.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-9021	Construction Managers	X	9	\$57,319	Bachelor's degree		
17-3022	Civil Engineering Technologists and Technicians		1	\$34,855	Associate degree	*	#
27-1025	Interior Designers		1	\$34,016	Bachelor's degree		
47-1011	First-Line Supervisors of Construction Trades and Extraction Workers		3	\$44,789	High school diploma or equivalent		
47-2021	Brick masons and Block masons		4	\$41,222	High school diploma or equivalent		
47-2031	Carpenters	X	8	\$34,417	High school diploma or equivalent		
47-2051	Cement Masons and Concrete Finishers	X	5	\$34,620	No formal educational credential		
47-2061	Construction Laborers	X	9	\$29,001	No formal educational credential		
47-2071	Paving, Surfacing, and Tamping Equipment Operators	X	2	\$34,601	High school diploma or equivalent		

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
47-2073	Operating Engineers and Other Construction Equipment Operators	X	8	\$35,999	High school diploma or equivalent	*	
47-2111	Electricians	X	9	\$38,893	High school diploma or equivalent	*	
47-2121	Glaziers		1	\$26,755	High school diploma or equivalent	*	
47-2131	Insulation Workers, Floor, Ceiling, and Wall		1	\$24,966	No formal educational credential		
47-2141	Painters, Construction and Maintenance	X	8	\$31,049	No formal educational credential		
47-2151	Pipelayers		1	\$34,530	No formal educational credential		
47-2152	Plumbers, Pipefitters, and Steamfitters	X	9	\$40,166	High school diploma or equivalent	*	
47-2181	Roofers	X	4	\$31,273	No formal educational credential		
47-3013	Helpers--Electricians	X	5	\$30,220	High school diploma or equivalent		
47-3015	Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters		1	\$25,853	High school diploma or equivalent		
47-4011	Construction and Building Inspectors		6	\$39,021	High school diploma or equivalent		
47-4090	Miscellaneous Construction and Related Workers	X	3	\$29,362	High school diploma or equivalent		
49-2098	Security and Fire Alarm Systems Installers	X	4	\$35,674	High school diploma or equivalent		
49-9021	Heating, Air Conditioning, and Refrigeration Mechanics and Installers		9	\$35,517	Postsecondary nondegree award	*	
49-9052	Telecommunications Line Installers and Repairers	X	4	\$41,153	High school diploma or equivalent		
49-9098	Helpers--Installation, Maintenance, and Repair Workers	X	7	\$27,063	High school diploma or equivalent		
53-7011	Conveyor Operators and Tenders		1	\$32,113	No formal educational credential	*	
53-7021	Crane and Tower Operators		2	\$37,531	High school diploma or equivalent		

Governor's Investment in Vocational Education (GIVE)

Cleveland State

The Governor's Investment in Vocational Education (GIVE) program aims to create long-term partnerships between Tennessee Colleges of Applied Technology (TCATs), community colleges, industries, economic development/workforce agencies, and K-12 schools. Its main goal is to identify and address the "skills gaps" present in the local workforce. GIVE is a competitive grant that awards of up to \$1 million to local higher education entities to facilitate collaboration between K12, higher education, and workforce partners.

Cleveland State has launched a Mechanical Electrical Plumbing (MEP) program at the Partnerships in Industry and Education (PIE) Innovation Center in Cleveland, TN, with the help of funding from GIVE 2.0. This educational facility helps to prepare students for postsecondary careers and workforce opportunities in the region. The PIE Innovation Center offers a unique learning experience by bringing together business, industry, secondary and postsecondary educational opportunities, and nonprofit services under one roof. This approach provides students with the necessary tools, education, and life skills to succeed. Partnerships with TCAT-Athens, Cleveland State Community College, and Chattanooga State Technical Community College enable students to use dual credit, dual enrollment, industry certification, to seamlessly transition into postsecondary programming. Students have access to embedded work-based learning and experiential learning in Science, Technology, Engineering, and Math (STEM) subjects, to help students visualize their future and promote design thinking.

Architecture and Construction Aligned Academic Programs

Postsecondary Architecture and Construction Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.0101	Architectural Engineering Technologies/Technicians.	C < 1 YR	12	25%	\$34,311
15.0101	Architectural Engineering Technologies/Technicians.	AA	21	57%	\$44,135
15.0201	Civil Engineering Technologies/Technicians.	AA	*	*	*
15.1001	Construction Engineering Technology/Technician.	C 1-2 YR	*	*	*
15.1001	Construction Engineering Technology/Technician.	AA	11	64%	\$62,613
46.0101	Mason/Masonry.	C 1-2 YR	*	*	*
46.0301	Electrical and Power Transmission Installation/Installer, General.	C < 1 YR	47	68%	\$45,390
46.0301	Electrical and Power Transmission Installation/Installer, General.	C 1-2 YR	53	72%	\$31,318
46.0302	Electrician.	C < 1 YR	75	71%	\$39,900
46.0302	Electrician.	C 1-2 YR	187	73%	\$37,913
46.0415	Building Construction Technology/Technician.	C < 1 YR	30	57%	\$26,038
46.0415	Building Construction Technology/Technician.	C 1-2 YR	121	59%	\$35,413
46.0502	Pipefitting/Pipefitter and Sprinkler Fitter.	C < 1 YR	*	*	*
46.0502	Pipefitting/Pipefitter and Sprinkler Fitter.	C 1-2 YR	21	57%	\$35,855
46.0503	Plumbing Technology/Plumber.	C < 1 YR	*	*	*
46.0503	Plumbing Technology/Plumber.	C 1-2 YR	17	71%	\$49,647
46.9999	Construction Trades, Other.	C < 1 YR	17	59%	\$33,844
46.9999	Construction Trades, Other.	C 1-2 YR	25	64%	\$30,487
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician.	C < 1 YR	67	67%	\$35,468
47.0201	Heating, Air Conditioning, Ventilation and Refrigeration Maintenance Technology/Technician.	C 1-2 YR	337	75%	\$40,763
50.0408	Interior Design.	AA	18	39%	\$39,810

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
50.0408	Interior Design.	BA	68	71%	\$43,320
52.2001	Construction Management, General.	BA	84	70%	\$62,960

As Tennessee builds necessary facilities to house a growing number of employers and employees alike, Tennessee’s colleges offer academic programs to build the skills needed for in-demand occupations in the Architecture and Construction Cluster. Tennessee’s public and private institutions are preparing students with the tradecraft to support this growth from the ground up.

Middle Tennessee State University (MTSU) offers a Bachelor of Science in Construction Management with two concentrations: Commercial Construction Management and Land Development/Residential Building Construction Management. The program is accredited by the Association of Technology, Management, and Applied Engineering (ATMAE) and a new building is under construction to house this program and Concrete Management.

Educational partners in the Northwest Tennessee region are reducing the shortage of skilled workers in the building construction trades. Secondary (high school) partners in Lake, Dyer, Obion, and Lauderdale counties, and postsecondary partner, TCAT Northwest, are working together to train the upcoming generation of electricians, construction equipment operators, sheet metal workers, pipe layers, and helpers, brick masons and block masons, and helpers, and related occupations, including construction and building inspectors.

High School CTE Architecture and Construction Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.0101	Architectural Engineering Technologies/Technicians.	CTE HS	643	53%	\$39,102
46.0415	Building Construction Technology/Technician.	CTE HS	891	53%	\$38,487
46.9999	Construction Trades, Other.	CTE HS	471	53%	\$39,453

High school CTE pathways offer students the opportunity to explore and gain skills in in-demand occupations in the Architecture and Construction cluster. The Building Construction Technology path graduated nearly 900 high school concentrators in 2021-22. The Architecture and Construction cluster houses several programs of study, including Residential and Commercial Construction, Mechanical, Electrical and Plumbing Systems, Structural Systems, Architectural and Engineering Design, and Interior Design with approximately 5,600 high school participants in 2022-23. While in these pathways, students can participate in pre-apprenticeships with Home Builders Institute and can earn multiple construction and heating, ventilation, and air conditioning (HVAC) credentials. Knox County Schools offers on-site work-based learning programs where students build cabins and participate in all aspects of construction, including supervising other students.

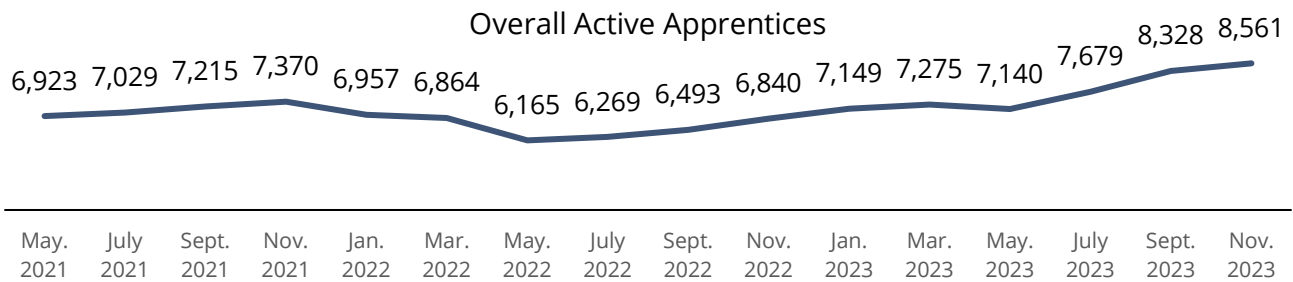
Architecture and Construction Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
15.0501	Heating, Ventilation, Air Conditioning and Refrigeration Engineering Technology/Technician.	18
46.0201	Carpentry/Carpenter.	56
46.0302	Electrician.	341
46.0303	Lineworker.	52
46.0402	Concrete Finishing/Concrete Finisher.	*
46.0403	Building/Home/Construction Inspection/Inspector.	*
46.0408	Painting/Painter and Wall Coverer.	*
46.0414	Insulator.	14
46.0502	Pipefitting/Pipefitter and Sprinkler Fitter.	84
46.0503	Plumbing Technology/Plumber.	30
46.9999	Construction Trades, Other.	45
48.0509	Ironworking/Ironworker.	25

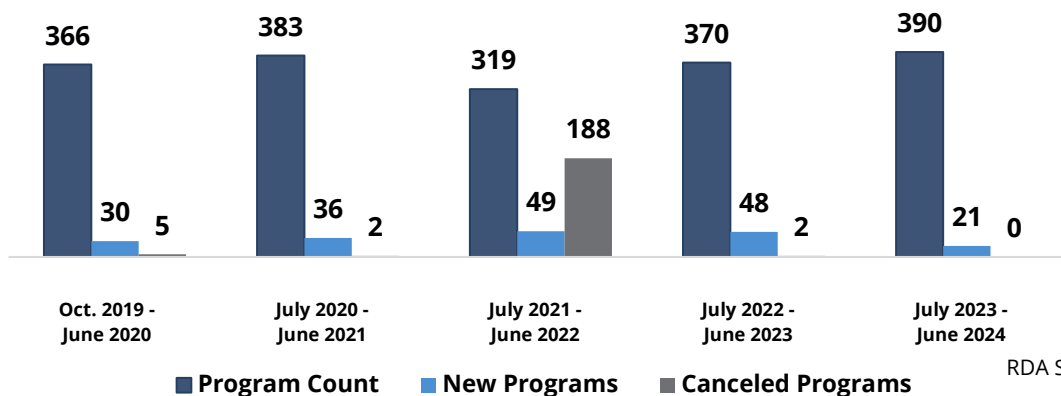
Apprenticeship Tennessee

Tennessee’s Office of Apprenticeship is persistent in its efforts to expand Registered Apprenticeship Programs (RAPs) to employers throughout the State. Tennessee is one of 28 states and territories to operate as a State Apprenticeship Agency. Apprenticeship TN builds strong partnerships with community agencies, workforce development partners, and employers in each of the Grand Divisions. The Apprenticeship TN team utilizes its partnership with the nine Local Workforce Development Boards (LWDBs) to connect employers with new or expanding RAPs to Workforce Innovation and Opportunity Act (WIOA) services and other funding opportunities to support the success of their programs.

In FY23, Apprenticeship TN operated through a combination of state appropriations and two federal grants. In addition to state funds, Tennessee was awarded a U.S. Department of Labor State Apprenticeship Expansion Basic Formula Funding grant for FY24.



Apprenticeship TN continues to build new apprenticeship programs for traditional and non-traditional occupations, including 47 new programs during FY23. Participants are gaining access to earn-and-learn models (individuals are paid and learn on the job) across industry sectors including, Early Childhood Educator, Electrician, Certified Nursing Assistant, Dental Assistant, Tool and Die Maker, Commercial Drone Pilot, Project Manager, Construction Laborer, Help Desk Support Technician, Power Line worker, and Mechatronics Technician. The number of registered occupational programs offered by existing sponsors continues to rise. From July 2022 to June 2023, 31 new occupational programs were added to existing sponsors. As of June 2023, Tennessee had 7,407 active apprentices, with 1,016 completing a Registered Apprenticeship this year.



Cluster Three: Manufacturing Occupations

Manufacturing represents approximately 15 percent of Tennessee's gross domestic product, the largest of any sector in the state.²⁸ From November 2022 through October 2023, Tennessee exported \$35.2 billion in manufactured goods.²⁹ The largest categories of exported manufactured goods in the last year included computer and electronic products, transportation equipment, chemicals, miscellaneous manufactured commodities, machinery, and electrical equipment, appliances, and components. The forecast for manufacturing employment in Tennessee suggests growth, in contrast to the national outlook which predicts a contraction in the sector.³⁰

Tennessee has excelled in growing one of the strongest specialized manufacturing workforces in the country. Tennessee's manufacturing employment is 34 percent more concentrated than the national average.³¹ Nearly every in-demand occupation in the manufacturing career cluster is key to the success of TNECD's target industry clusters.

Since 2019, TNECD has announced nearly 340 manufacturing projects with over 50,800 new job commitments. Manufacturing jobs represent over half the new job commitments generated through TNECD's projects since 2019. The largest manufacturing job announcement in the state's history occurred in 2021 with Ford Motor Company. Ford announced its once-in-a-generation investment to create a 3,600-acre mega campus called Blue Oval City on the Memphis Regional Megasite to produce all-electric F-Series trucks beginning in 2025.³² In 2022, LG Chem announced its plan to invest approximately \$3.2 billion to establish what is expected to be the largest cathode manufacturing facility in the United States. This facility, to be in Clarksville, Tennessee, will support the expanding U.S. electric vehicle market.³³

Across various industries, there is a demand for skilled roles within the manufacturing sector. The consistent regional demand for supervisory and machinery operator roles demonstrates the need for managing complex production processes and operating advanced machinery, essential in maintaining the efficiency of production lines and ensuring adherence to quality standards. Furthermore, machinists and welders are key in manufacturing high-tolerance parts, integral in creating precise components. Maintenance and repair roles demonstrate a significant regional demand; workers in this field help to sustain operational efficiency and minimize equipment downtime.

²⁸ U.S. Bureau of Economic Analysis, Gross Domestic Product by State, 2022 Quarter 3

²⁹ U.S. Census Bureau, USA Trade Online, State Export Data, Commodities (31,32,33), December 2021 – November 2022

³⁰ Boyd Center for Business and Economic Research, *An Economic Report to the Governor of the State of Tennessee*, 2024

³¹ U.S. Bureau of Labor Statistics, QCEW, Employment Location Quotient, June 2023

³² TNECD [Press Release](#)

³³ TNECD [Press Release](#)

Governor's Investment in Vocational Education (GIVE)

TCAT Knoxville



The Governor's Investment in Vocational Education (GIVE) program aims to create long-term partnerships between Tennessee Colleges of Applied Technology (TCATs), community colleges, industries, economic development/workforce agencies, and K-12 schools. Its main goal is to identify and address the "skills gaps" present in the local workforce. GIVE is a competitive grant that awards of up to \$1 million to local higher education entities to facilitate collaboration between K12, higher education, and workforce partners.

With funding from GIVE 2.0, Tennessee College of Applied Technology (TCAT) Knoxville created an Industrial Development Initiative at Anderson County Career Technical Center. The project has addressed some of the most pressing workforce-related needs in the East Tennessee region, including barriers to education and training and a lack of awareness of viable career choices and training options in high-demand CTE fields. Remake Learning Days, a work-based learning initiative, engaged over nine hundred (900) Anderson County 6th-grade students in the fall 2023. Students participated in hands-on learning experiences in virtual welding and built electrical motors providing interactive and immersive exposure to CTE fields. Dual enrollment in CTE fields for grades 10-12 has increased from one hundred twenty (120) students in the fall of 2022 to over one hundred ninety-two (192) in the fall of 2023.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
11-3051	Industrial Production Managers		1	\$67,138	Bachelor's degree	*	
13-1051	Cost Estimators	X	7	\$44,082	Bachelor's degree	*	
19-4031	Chemical Technicians	X	1	\$36,583	Associate degree	*	#
47-2211	Sheet Metal Workers		3	\$33,669	High school diploma or equivalent	*	
49-1011	First-Line Supervisors of Mechanics, Installers, and Repairers		6	\$44,257	High school diploma or equivalent	*	
49-2011	Computer, Automated Teller, and Office Machine Repairers	X	2	\$28,753	Some college, no degree	*	
49-2022	Telecommunications Equipment Installers and Repairers, Except Line Installers	X	7	\$42,036	Postsecondary nondegree award	*	
49-2094	Electrical and Electronics Repairers, Commercial and Industrial Equipment		3	\$42,785	Postsecondary nondegree award	*	
49-9041	Industrial Machinery Mechanics		3	\$42,307	High school diploma or equivalent	*	
49-9043	Maintenance Workers, Machinery		3	\$39,681	High school diploma or equivalent	*	
49-9044	Millwrights		1	\$33,130	High school diploma or equivalent	*	
49-9062	Medical Equipment Repairers		1	\$39,218	Associate degree	*	
49-9071	Maintenance and Repair Workers, General		3	\$29,546	High school diploma or equivalent	*	
49-9099	Installation, Maintenance, and Repair Workers, All Other	X	8	\$31,048	High school diploma or equivalent		
51-1011	First-Line Supervisors of Production and Operating Workers	X	9	\$42,576	High school diploma or equivalent	*	
51-2041	Structural Metal Fabricators and Fitters	X	3	\$34,613	High school diploma or equivalent	*	
51-2051	Fiberglass Laminators and Fabricators		1	\$31,482	High school diploma or equivalent	*	

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
51-2090	Miscellaneous Assemblers and Fabricators	X	9	\$29,981	High school diploma or equivalent	*	
51-3021	Butchers and Meat Cutters	X	8	\$27,032	No formal educational credential	*	
51-3022	Meat, Poultry, and Fish Cutters and Trimmers	X	3	\$25,258	No formal educational credential	*	
51-3092	Food Batchmakers	X	4	\$28,478	High school diploma or equivalent	*	
51-4023	Rolling Machine Setters, Operators, and Tenders, Metal and Plastic		1	\$30,112	High school diploma or equivalent	*	
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic		2	\$30,043	High school diploma or equivalent	*	
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	X	5	\$30,208	High school diploma or equivalent	*	
51-4035	Milling and Planing Machine Setters, Operators, and Tenders, Metal and Plastic		1	\$31,143	High school diploma or equivalent	*	
51-4041	Machinists		5	\$35,236	High school diploma or equivalent	*	
51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic		2	\$29,650	High school diploma or equivalent	*	
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	X	7	\$32,150	High school diploma or equivalent	*	
51-4121	Welders, Cutters, Solderers, and Brazers	X	8	\$35,801	High school diploma or equivalent	*	
51-4122	Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders		5	\$31,350	High school diploma or equivalent	*	
51-4199	Metal Workers and Plastic Workers, All Other	X	5	\$30,910	High school diploma or equivalent	*	
51-7011	Cabinetmakers and Bench Carpenters	X	1	\$27,441	High school diploma or equivalent		

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
51-7041	Sawing Machine Setters, Operators, and Tenders, Wood		3	\$28,324	High school diploma or equivalent		
51-7042	Woodworking Machine Setters, Operators, and Tenders, Except Sawing		1	\$26,964	High school diploma or equivalent		
51-8013	Power Plant Operators		1	\$67,638	High school diploma or equivalent		
51-9021	Crushing, Grinding, and Polishing Machine Setters, Operators, and Tenders		2	\$31,319	High school diploma or equivalent	*	
51-9023	Mixing and Blending Machine Setters, Operators, and Tenders		3	\$29,759	High school diploma or equivalent	*	
51-9032	Cutting and Slicing Machine Setters, Operators, and Tenders	X	3	\$28,954	High school diploma or equivalent	*	
51-9041	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders		1	\$31,503	High school diploma or equivalent	*	
51-9051	Furnace, Kiln, Oven, Drier, and Kettle Operators and Tenders		1	\$33,758	High school diploma or equivalent	*	
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	X	8	\$29,647	High school diploma or equivalent	*	
51-9111	Packaging and Filling Machine Operators and Tenders	X	9	\$28,334	High school diploma or equivalent	*	
51-9123	Painting, Coating, and Decorating Workers		2	\$29,977	No formal educational credential	*	
51-9124	Coating, Painting, and Spraying Machine Setters, Operators, and Tenders	X	8	\$32,008	High school diploma or equivalent	*	
51-9161	Computer Numerically Controlled Tool Operators	X	7	\$34,838	High school diploma or equivalent	*	
51-9198	Helpers--Production Workers	X	4	\$27,539	High school diploma or equivalent	*	
51-9199	Production Workers, All Other	X	7	\$26,715	High school diploma or equivalent	*	

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
53-7063	Machine Feeders and Offbearers		1	\$32,656	No formal educational credential	*	

Manufacturing Aligned Academic Programs

Postsecondary Manufacturing Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician.	C < 1 YR	73	52%	\$49,845
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician.	C 1-2 YR	26	81%	\$41,766
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician.	AA	93	84%	\$54,827
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician.	BA	10	80%	\$74,667
15.0702	Quality Control Technology/Technician.	C < 1 YR	*	*	*
41.0303	Chemical Process Technology.	C < 1 YR	*	*	*
41.0303	Chemical Process Technology.	C 1-2 YR	*	*	*
47.0101	Electrical/Electronics Equipment Installation and Repair Technology/Technician, General.	AA	*	*	*
47.0105	Industrial Electronics Technology/Technician.	C < 1 YR	*	*	*
47.0105	Industrial Electronics Technology/Technician.	C 1-2 YR	11	73%	\$40,914
47.0303	Industrial Mechanics and Maintenance Technology/Technician.	C < 1 YR	110	61%	\$40,031
47.0303	Industrial Mechanics and Maintenance Technology/Technician.	C 1-2 YR	436	77%	\$57,663
47.0303	Industrial Mechanics and Maintenance Technology/Technician.	AA	*	*	*
48.0501	Machine Tool Technology/Machinist.	C < 1 YR	31	81%	\$36,812
48.0501	Machine Tool Technology/Machinist.	C 1-2 YR	213	77%	\$42,111
48.0503	Machine Shop Technology/Assistant.	C 1-2 YR	12	50%	\$30,900
48.0507	Tool and Die Technology/Technician.	C < 1 YR	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
48.0507	Tool and Die Technology/Technician.	C 1-2 YR	*	*	*
48.0508	Welding Technology/Welder.	C < 1 YR	177	59%	\$34,966
48.0508	Welding Technology/Welder.	C 1-2 YR	601	71%	\$39,550
48.0510	Computer Numerically Controlled (CNC) Machinist Technology/CNC Machinist.	C < 1 YR	*	*	*
48.0510	Computer Numerically Controlled (CNC) Machinist Technology/CNC Machinist.	C 1-2 YR	*	*	*
52.0205	Operations Management and Supervision.	C < 1 YR	26	77%	\$41,923
52.0205	Operations Management and Supervision.	BA	*	*	*

Public and private investment continue to fuel growth in Tennessee’s manufacturing sector. Likewise, investments at Tennessee colleges and universities are resulting in academic programs that are better equipped to create Tennessee’s workforce of tomorrow. The breadth of programs offered in the Manufacturing Cluster highlight the array of opportunities available in this growing sector of the state’s economy.

High School CTE Manufacturing Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.0407	Mechatronics, Robotics, Automotive. Engineering. Technology/Tech.	CTE HS	466	53%	\$37,211
48.0503	Machine Shop Technology/Assistant.	CTE HS	431	51%	\$38,210
48.0508	Welding Technology/Welder.	CTE HS	1,315	53%	\$37,751

High school programming is available to encourage students’ exploration and credit accumulation towards programs in the Manufacturing cluster. Notably, over 1,300 high school graduates concentrated in Welding in 2021-22 and over half of those graduates were found in employed in Tennessee. In 2022-23, high schools offered four programs of study: Industrial Maintenance, Mechatronics, Welding, and Machining Technology. In addition to early postsecondary opportunities (EPSOs) in partnership with Tennessee Colleges of Applied Technology, students have opportunities to participate in school-based enterprises

such as Oak Ridge High School's Wildcat Manufacturing, a student-run business that provides real-world experience by obtaining work projects from local businesses.³⁴

Manufacturing Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician.	18
15.0407	Mechatronics, Robotics, and Automation Engineering Technology/Technician.	*
41.0303	Chemical Process Technology.	79
47.0101	Electrical/Electronics Equipment Installation and Repair Technology/Technician, General.	*
47.0303	Industrial Mechanics and Maintenance Technology/Technician.	39
48.0501	Machine Tool Technology/Machinist.	10
48.0506	Sheet Metal Technology/Sheetworking.	62
48.0507	Tool and Die Technology/Technician.	13
48.0508	Welding Technology/Welder.	*
48.9999	Precision Production, Other.	*

³⁴ The Composites iacmi Institute, Wildcat Manufacturing: The Story Behind IACMI Members Meeting SWAG, <https://iacmi.org/wildcat-manufacturing-story-behind-smm2023-swag/>

Supporting Postsecondary Access in Rural Communities (SPARC)

TCAT Knoxville



Supporting Postsecondary Access in Rural Communities (SPARC) is a program that aims to provide Career and Technical Education (CTE) to high school and adult learners in ninety-one (91) counties of Tennessee. The program focuses on overcoming three main obstacles: inadequate infrastructure, limited geographic access to higher education, and insufficient dual enrollment options for CTE. SPARC collaborates closely with local communities and education stakeholders to ensure that these obstacles are eliminated.

Anderson County has partnered with Tennessee College of Applied Technology (TCAT) Knoxville to expand its CTE course offerings with the help of SPARC funds. Two welding programs at Anderson High and Clinton High School have been fully equipped because of SPARC funds. Students can now acquire skills using state-of-the-art trainers and equipment and earn industry credentials as dual enrollment students. They can further their training at the TCAT Knoxville's Anderson County Higher Education Center or their main campus in Knoxville. This investment has helped to increase the number of potential welders in the area.

Cluster Four: Transportation Occupations

Tennessee is a leading state in transportation, distribution, and logistics. Tennessee shares a border with eight states making its location convenient and economical for moving freight and products across the United States and abroad. The state offers immediate access to eight interstate highways and has six Class I railroads, six commercial airports, and more than 970 main channel miles of commercially navigable waterways. These are some of the characteristics that attract companies reliant on transportation positions in Tennessee.

Logisticians are in-demand statewide and have one of the highest paying entry-level wages for occupations in this cluster at \$47,298. The median annual wage for logisticians in 2022 in Tennessee was \$63,650 with about 500 openings for logisticians projected each year, on average, from 2020 to 2030.³⁵

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
13-1081	Logisticians	X	8	\$47,298	Bachelor's degree	*	
43-5021	Couriers and Messengers		4	\$24,187	High school diploma or equivalent	*	
43-5061	Production, Planning, and Expediting Clerks	X	8	\$34,837	High school diploma or equivalent	*	
43-5071	Shipping, Receiving, and Inventory Clerks		9	\$30,541	High school diploma or equivalent	*	
49-3021	Automotive Body and Related Repairers	X	8	\$33,235	High school diploma or equivalent		
49-3023	Automotive Service Technicians and Mechanics		7	\$31,045	Postsecondary nondegree award	*	
49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	X	8	\$36,840	High school diploma or equivalent	*	
49-3042	Mobile Heavy Equipment Mechanics, Except Engines	X	7	\$39,800	High school diploma or equivalent	*	
49-3093	Tire Repairers and Changers		4	\$26,203	High school diploma or equivalent		
53-3031	Driver/Sales Workers		3	\$19,365	High school diploma or equivalent	*	

³⁵ TN Dept of Labor and Workforce Development, Employment Projections 2020-2030, onetonline.org

Mobile American Job Center (AJC)

The mission of the Mobile American Job Center (AJC) is to provide employment resources and one-on-one assistance to all Tennesseans, especially those in rural areas who do not have access to brick-and-mortar AJCs. Clients with barriers to employment are frequently unemployed, underemployed, skills-deficient, and/or have a lack of transportation, among other barriers. Lack of transportation or not having a brick-and-mortar AJC close to where clients live can be barriers to employment and access to supportive services provided by the workforce system. For those who lack computer skills, access to employment services is vital. Mobile AJCs provide a solution to these issues by bringing workforce services to the public.

Mobile AJCs are staffed by Wagner-Peyser and partner programs staff. Any service that is provided in brick-and-mortar is also provided on the Mobile AJC. Mobile AJC staff reaches out to common organizations found in every community to provide employment services, including homeless shelters, public housing, prisons, faith-based organizations, Department of Human Services (DHS) offices, YWCAs and YMCAs, local food banks, and senior citizen facilities.



Employer Resources

Mobile AJCs support employers who are opening a new facility or seeking employees. Mobile AJCs also provide services to assist employers and employees in the event of a business closure or layoff. Tennesseans can file for their unemployment benefits online through a Mobile AJC.

The Mobile AJCs support recruitment and provide access to job seekers who may need assistance with an online application, updating their resume, or interview tips. Mobile AJCs help Tennesseans and employers across the state at all stages of the workforce development continuum.

Mobile American Job Center Outreach Strategy

Mobile AJCs advance workforce development in all 95 counties by:

- Meeting with local Chambers of Commerce to inform local businesses of Mobile AJC resources. This includes tours of Mobile AJCs to increase awareness of the benefits the mobile units provide.
- Building partnerships between educational institutions and sponsoring organizations to open new pathways for growth and success and pave a better road to the future for students.
- Reaching out to Community Tennessee Rehabilitation Centers to provide job services to those with disabilities, as well as providing services to people with disabilities, generally.
- Visiting VA hospitals and supporting veterans generally to assist with their workforce-related needs.
- Serving senior citizens by visiting retirement facilities, senior community centers, and assisted living facilities. The Mobile AJC can assist senior citizens in finding jobs that are appropriate for their capabilities, as well as refer them to other services that might be needed.

Best Practices

Mobile AJCs strive to serve the State of Tennessee by creating events to assist both the public and private sectors, giving tours, and talking about the services that are offered through the Mobile AJC. Some examples are listed below:

Re-entry events: The Mobile AJCs assist those who are 30 days from release from incarceration, as well as those who are on probation or parole, in learning how to create a resume, job search and interview for a position, as well as teaching soft skills. This is crucial information for those who are justice-involved when reentering society.

TAA Open House: Mobile AJCs have partnered with the Trade Adjustment Assistance (TAA) Program staff. TAA staff support workers who have lost their jobs due to foreign trade with opportunities to become reemployed. They have held an Open House across the state, primarily in rural areas, to raise awareness and provide services for workers who have been impacted by foreign trade and are covered under U.S. Department of Labor (U.S. DOL) certified trade petitions.

High Schools, Colleges, Universities, TCATs: The Mobile AJCs have an ongoing relationship with the high school and college students, assisting high school seniors who are not college-bound, as well as individuals ready to graduate from a higher education program who are about to enter the workforce.

Non-Profits: The Mobile AJCs serve non-profits regularly. Recently, a Mobile AJC event was held at a church – participants were made-up of immigrants from 16 different countries. Several participants had multiple degrees, having worked as doctors, nurses, attorneys, etc. in the past; however, their credentials are not valid in the US. Participants are working low-paying jobs to get by and cannot support their families. The Mobile AJC, with assistance from an interpreter, presented a workshop on how to job search in the U.S. and assisted participants in searching for jobs online. The success of this programming has resulted in plans to conduct a series of events, including additional workshops.

The Tennessee Department of Labor and Workforce Development's (TDLWD) involvement through the Mobile AJC forum has allowed TDLWD staff to engage, enhance, enable, and empower all Tennesseans to the work force. In 2023, TDLWD was invited to present at the Regional Convening of U.S. DOL where staff presented on the Mobile AJC and best practices for serving rural communities.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
53-3032	Heavy and Tractor-Trailer Truck Drivers	X	9	\$37,627	Postsecondary nondegree award	*	
53-3033	Light Truck Drivers		8	\$27,967	High school diploma or equivalent	*	
53-3052	Bus Drivers, Transit and Intercity		1	\$28,920	High school diploma or equivalent		
53-5021	Captains, Mates, and Pilots of Water Vessels		1	\$60,066	Postsecondary nondegree award		
53-7051	Industrial Truck and Tractor Operators	X	9	\$31,285	No formal educational credential	*	
53-7061	Cleaners of Vehicles and Equipment		1	\$23,254	No formal educational credential	*	
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	X	9	\$27,637	No formal educational credential	*	
53-7064	Packers and Packers, Hand		2	\$24,443	No formal educational credential	*	

Transportation Aligned Academic Programs

Postsecondary Transportation Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
47.0302	Heavy Equipment Maintenance Technology/Technician.	C 1-2 YR	*	*	*
47.0603	Autobody/Collision and Repair Technology/Technician.	C < 1 YR	30	63%	\$26,863
47.0603	Autobody/Collision and Repair Technology/Technician.	C 1-2 YR	115	67%	\$34,059
47.0604	Automobile/Automotive Mechanics Technology/Technician.	C < 1 YR	100	66%	\$28,556
47.0604	Automobile/Automotive Mechanics Technology/Technician.	C 1-2 YR	204	74%	\$37,306

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
47.0604	Automobile/Automotive Mechanics Technology/Technician.	AA	*	*	*
47.0605	Diesel Mechanics Technology/Technician.	C < 1 YR	61	66%	\$34,542
47.0605	Diesel Mechanics Technology/Technician.	C 1-2 YR	106	71%	\$43,130
49.0205	Truck and Bus Driver/Commercial Vehicle Operator and Instructor.	C < 1 YR	373	62%	\$52,289
52.0203	Logistics, Materials, and Supply Chain Management.	C < 1 YR	38	74%	\$44,059
52.0203	Logistics, Materials, and Supply Chain Management.	BA	403	47%	\$62,207
52.0203	Logistics, Materials, and Supply Chain Management.	MA	15	47%	\$90,629

Tennessee colleges offer an array of academic programs to train those who support Tennessee's supply chain.

Nashville State Community College offers short-term certificates in Supply Chain, Logistics, and Transportation—all of which are 21 hours or less. With estimated first year wages of over \$44,000, these certificate programs represent a tremendous investment opportunity.

With the help of SPARC 4.0 funding, Hardeman County is committed to enhancing the opportunities for Automotive dual enrollment students. SPARC 4.0 funding has been used to purchase advanced training equipment and simulators so high school students can gain practical experience in a real shop environment. This includes using multiple lifts, wheel alignment systems, and other equipment commonly found in an automotive shop.

High School CTE Transportation Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
47.0603	Autobody/Collision and Repair Technology/Technician.	CTE HS	269	51%	\$37,857
47.0604	Automobile/Automotive Mechanics Technology/Technician.	CTE HS	1,561	53%	\$39,578
51.0810	Emergency Care Attendant (EMT Ambulance)	CTE HS	762	51%	\$39,430

HS CTE students completing concentrations in the transportation cluster in 2021-2022 are shown in the table above. Through HS CTE pathways, students have access to dual enrollment programs like Milan High School's partnership with TCAT Jackson where students begin earning clock hours in their freshmen year in a Maintenance and Light Repair lab outfitted with equipment purchased with Innovative School Model grant funds. Through the same grant, some schools are beginning Aviation Flight programs, such as Elizabethton High School where Aviation Flight students earn their private pilot license before they graduate from high school.

Transportation Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
47.0302	Heavy Equipment Maintenance Technology/Technician.	*
47.0604	Automobile/Automotive Mechanics Technology/Technician.	14
47.0606	Small Engine Mechanics and Repair Technology/Technician.	*
49.0205	Truck and Bus Driver/Commercial Vehicle Operator and Instructor.	26
52.0203	Logistics, Materials, and Supply Chain Management.	*

Innovative School Models

The Tennessee Department of Education (TDOE), under the direction of Commissioner Lizzette Gonzalez Reynolds, exhibits a strong commitment to Career and Technical Education (CTE) for all students. Building upon the state's strong commitment to ensure Tennessee is future workforce ready, over \$560 million in funds were allocated to support Innovative School Model grants, which expand CTE opportunities in 839 Tennessee middle and high schools. Governor Bill Lee and the Tennessee General Assembly awarded \$530 million in state funds, which were supplemented by \$32.9 million in Elementary and Secondary School Emergency Relief 3.0 (ESSER) funds to support Innovative School Model grants.

School districts have a diverse set of projects underway as a result of this funding. Some projects aim to increase offerings of middle school CTE programs and career exploration. Career coaches are being hired in both middle and high schools to assist counselors with the creation of differentiated coursework based on student goals. Innovative School Model grants also allow districts to purchase equipment, such as forklifts and hydraulic and pneumatic trainers, for manufacturing and industrial maintenance programs. Health science programs, through these grants, can increase access to virtual equipment which give students the ability for in-depth exploration of the human body and virtual surgical opportunities. Schools are using classrooms and libraries as an opportunity to build makerspaces, with access to 3D printers, drones, podcasting equipment, and laser etchers. Several districts have purchased vans to help students overcome transportation barriers to work-based learning experiences. This grant is especially meaningful for smaller districts.



Cluster Five: Business, Finance, Government Management, and Support Services Occupations

The business, finance and government management and support services sectors are characterized by a concentration of managerial and professional occupations. Nationally, employment for business and financial occupations are expected to outpace the average for all occupations.³⁶ Home to ten Fortune 500 companies, Tennessee exhibits a sustained demand for these occupational categories.³⁷ These positions are significant in the context of the knowledge economy, where economic growth is increasingly reliant on the acquisition and application of knowledge and information.

In recent years, Tennessee's economic data indicates a steady growth in sectors such as headquarters and business support services as well as the finance and insurance sectors. The headquarters industry, for instance, has expanded by approximately 10 percent, equating to an addition of around 5,100 jobs over the past five years. In a regional comparison, this growth places Tennessee fourth in the southeast and 18th nationally.³⁸ The finance and insurance sector has also experienced growth, with employment increasing by nine percent, representing an addition of 10,400 jobs.³⁹ In terms of new job creation within this sector, Tennessee ranks ninth nationally and fifth in the southeast over a five-year period. Furthermore, in 2022, the finance and insurance sector ranked seventh in the state for the number of new business applications, an indicator of sustained growth post-pandemic.⁴⁰

The occupational data for Tennessee indicates a consistent statewide demand for managerial and analytical roles across multiple industries, with a particular emphasis on positions requiring a bachelor's degree for entry. The prevalence of management analysts, human resource managers, and accountants and auditors suggest a strategic focus on organizational efficiency, workforce management, and fiscal accountability. Management analysts are central to improving business processes through their expertise in refining operational efficiencies and human capital strategies. This occupation requires technical proficiencies in data analysis and information systems, with job postings specifying competencies in SQL, MS Office, Jitterbit, GitHub, and Tableau skills.⁴¹

Human resource managers and specialists are in-demand across the state and they are professionals who navigate organizational dynamics and enhance workforce performance.

³⁶ Bureau of Labor Statistics, Occupational Outlook Handbook, Business and Financial Occupations

³⁷ [Fortune500](#), 2023

³⁸ U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2016 - 2021

³⁹ U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2016 - 2021

⁴⁰ Boyd Center for Business and Economic Research, *An Economic Report to the Governor of the State of Tennessee*, 2024

⁴¹ Jobs4TN.gov, Occupation Data, Occupation Summary

The job market underscores the importance of advanced interpersonal abilities, analytical judgements, and the capacity to manage complex employee relations, with most positions necessitating at least a bachelor’s degree.

Accountants and auditors represent another category of professionals in demand, with over 300 of the online job postings for accountants calling for candidates possessing an American Institute of CPAs (AICPA) certification.⁴² Financial managers have a median wage over \$129,900 in Tennessee and make up over 10 percent of the total annual projected job openings in management related occupations. Industries in which they are predominately employed include accounting, tax preparation, and bookkeeping services, with over 100 job postings looking for candidates with an American Institute of CPAs (AICPA) certification.⁴³

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-1011	Chief Executives	X	3	\$44,748	Bachelor's degree	*	
11-1021	General and Operations Managers		9	\$57,596	Bachelor's degree	*	
11-3031	Financial Managers		6	\$82,470	Bachelor's degree	*	
11-3061	Purchasing Managers		4	\$82,474	Bachelor's degree	*	
11-3071	Transportation, Storage, and Distribution Managers		7	\$59,054	High school diploma or equivalent	*	
11-3121	Human Resources Managers		9	\$70,763	Bachelor's degree	*	
11-9041	Architectural and Engineering Managers		5	\$95,598	Bachelor's degree	*	#
11-9111	Medical and Health Services Managers	X	8	\$66,563	Bachelor's degree	*	
11-9141	Property, Real Estate, and Community Association Managers	X	7	\$39,179	High school diploma or equivalent		
11-9151	Social and Community Service Managers	X	6	\$52,722	Bachelor's degree		
11-9199	Managers, All Other		1	\$45,698	Bachelor's degree	*	
13-1031	Claims Adjusters, Examiners, and Investigators		1	\$44,488	High school diploma or equivalent		

⁴² Jobs4TN.gov, Occupation Data, Occupation Summary

⁴³ Jobs4TN.gov, Occupation Data, Occupation Summary

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
13-1071	Human Resources Specialists	X	8	\$38,070	Bachelor's degree	*	
13-1111	Management Analysts	X	9	\$56,766	Bachelor's degree	*	
13-1141	Compensation, Benefits, and Job Analysis Specialists		1	\$36,492	Bachelor's degree	*	
13-1151	Training and Development Specialists		3	\$35,709	Bachelor's degree	*	
13-1161	Market Research Analysts and Marketing Specialists	X	9	\$37,623	Bachelor's degree	*	
13-2011	Accountants and Auditors	X	9	\$47,341	Bachelor's degree	*	
13-2041	Credit Analysts		1	\$49,877	Bachelor's degree	*	
13-2051	Financial and Investment Analysts		2	\$55,252	Bachelor's degree	*	
13-2072	Loan Officers		4	\$43,149	Bachelor's degree	*	
13-2082	Tax Preparers	X	2	\$22,256	High school diploma or equivalent	*	
15-2031	Operations Research Analysts	X	3	\$40,653	Bachelor's degree	*	#
27-3031	Public Relations Specialists		2	\$18	Bachelor's degree	*	
31-9094	Medical Transcriptionists	X	1	\$22,987	Postsecondary nondegree award		
41-3021	Insurance Sales Agents	X	8	\$33,265	High school diploma or equivalent		
43-1011	First-Line Supervisors of Office and Administrative Support Workers		4	\$39,887	High school diploma or equivalent	*	
43-3011	Bill and Account Collectors	X	5	\$28,169	High school diploma or equivalent	*	
43-3021	Billing and Posting Clerks	X	7	\$31,557	High school diploma or equivalent	*	
43-3031	Bookkeeping, Accounting, and Auditing Clerks		9	\$30,253	Some college, no degree	*	
43-3051	Payroll and Timekeeping Clerks	X	8	\$32,642	High school diploma or equivalent		
43-3071	Tellers		2	\$26,812	High school diploma or equivalent		
43-4031	Court, Municipal, and License Clerks		1	\$29,295	High school diploma or equivalent		

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
43-4051	Customer Service Representatives	X	9	\$26,365	High school diploma or equivalent	*	
43-4071	File Clerks		4	\$26,735	High school diploma or equivalent		
43-4111	Interviewers, Except Eligibility and Loan	X	3	\$28,355	High school diploma or equivalent		
43-4131	Loan Interviewers and Clerks		1	\$29,417	High school diploma or equivalent		
43-4151	Order Clerks	X	4	\$27,503	Some college, no degree	*	
43-4161	Human Resources Assistants, Except Payroll and Timekeeping	X	9	\$30,909	Associate degree		
43-4199	Information and Record Clerks, All Other		3	\$25,783	High school diploma or equivalent		
43-5032	Dispatchers, Except Police, Fire, and Ambulance	X	9	\$28,534	High school diploma or equivalent	*	
43-5051	Postal Service Clerks	X	7	\$46,508	High school diploma or equivalent		
43-5052	Postal Service Mail Carriers		1	\$39,935	High school diploma or equivalent		
43-6011	Executive Secretaries and Executive Administrative Assistants	X	9	\$41,469	High school diploma or equivalent	*	
43-6013	Medical Secretaries and Administrative Assistants		1	\$28,172	High school diploma or equivalent		
43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	X	9	\$27,859	High school diploma or equivalent	*	
43-9021	Data Entry Keyers	X	6	\$27,789	High school diploma or equivalent	*	
43-9051	Mail Clerks and Mail Machine Operators, Except Postal Service		2	\$26,131	High school diploma or equivalent		
43-9061	Office Clerks, General	X	7	\$23,733	High school diploma or equivalent	*	
43-9199	Office and Administrative Support Workers, All Other		5	\$22,727	High school diploma or equivalent		

Business, Finance, Government Management, and Support Services Aligned Academic Programs

Postsecondary Business, Finance, Government Management, and Support Services Degrees 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
01.0103	Agricultural Economics.	MA	*	*	*
09.0900	Public Relations, Advertising, and Applied Communication.	BA	*	*	*
09.0901	Organizational Communication, General.	BA	*	*	*
09.0902	Public Relations/Image Management.	BA	122	43%	\$42,627
09.0902	Public Relations/Image Management.	MA	*	*	*
09.0905	Health Communication.	CPBA	*	*	*
09.0907	International and Intercultural Communication.	BA	*	*	*
09.0909	Communication Management and Strategic Communications.	MA	14	79%	\$64,088
09.0999	Public Relations, Advertising, and Applied Communication, Other.	BA	*	*	*
15.1501	Engineering/Industrial Management.	BA	88	67%	\$61,647
15.1501	Engineering/Industrial Management.	CPBA	*	*	*
15.1501	Engineering/Industrial Management.	MA	20	35%	\$106,526
42.2804	Industrial and Organizational Psychology.	MA	27	41%	\$53,315
43.0301	Homeland Security.	BA	*	*	*
43.0302	Crisis/Emergency/Disaster Management.	BA	17	35%	\$51,091
43.0302	Crisis/Emergency/Disaster Management.	CPBA	*	*	*
44.0401	Public Administration.	BA	12	58%	\$29,474
44.0401	Public Administration.	CPBA	13	69%	\$90,567
44.0401	Public Administration.	MA	84	67%	\$59,886
44.0401	Public Administration.	D	*	*	*
44.0501	Public Policy Analysis, General.	BA	*	*	*
44.0501	Public Policy Analysis, General.	CPBA	*	*	*
44.0501	Public Policy Analysis, General.	MA	15	67%	\$54,606
44.0503	Health Policy Analysis.	CPBA	*	*	*
44.9999	Public Administration and Social Service Professions, Other.	AA	*	*	*
44.9999	Public Administration and Social Service Professions, Other.	BA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
45.0601	Economics, General.	BA	66	47%	\$45,119
45.0601	Economics, General.	MA	*	*	*
45.0601	Economics, General.	D	*	*	*
45.0603	Econometrics and Quantitative Economics.	BA	*	*	*
45.0603	Econometrics and Quantitative Economics.	MA	*	*	*
45.0603	Econometrics and Quantitative Economics.	D	*	*	*
45.0605	International Economics.	BA	*	*	*
45.0699	Economics, Other.	BA	*	*	*
45.1001	Political Science and Government, General.	BA	453	53%	\$33,533
45.1002	American Government and Politics (United States).	CPBA	*	*	*
45.1004	Political Economy.	BA	10	10%	*
45.1201	Urban Studies/Affairs.	BA	19	63%	\$46,380
46.0401	Building/Property Maintenance.	C < 1 YR	*	*	*
46.0401	Building/Property Maintenance.	C 1-2 YR	*	*	*
50.1001	Arts, Entertainment, and Media Management, General.	BA	*	*	*
50.1002	Fine and Studio Arts Management.	BA	*	*	*
50.1003	Music Management.	BA	116	66%	\$27,702
50.1004	Theatre/Theatre Arts Management.	BA	*	*	*
51.0701	Health/Health Care Administration/Management.	AA	11	91%	\$37,200
51.0701	Health/Health Care Administration/Management.	BA	113	55%	\$43,857
51.0701	Health/Health Care Administration/Management.	CPBA	*	*	*
51.0701	Health/Health Care Administration/Management.	MA	84	63%	\$57,802
51.0702	Hospital and Health Care Facilities Administration/Management.	MA	18	44%	\$72,288
51.0706	Health Information/Medical Records Administration/Administrator.	BA	14	86%	\$42,853
51.0706	Health Information/Medical Records Administration/Administrator.	CPBA	*	*	*
51.0706	Health Information/Medical Records Administration/Administrator.	MA	16	50%	\$85,660
51.0710	Medical Office Assistant/Specialist.	C < 1 YR	*	*	*
51.0710	Medical Office Assistant/Specialist.	C 1-2 YR	17	71%	\$30,622
51.0713	Medical Insurance Coding Specialist/Coder.	C < 1 YR	32	56%	\$26,535

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
51.0713	Medical Insurance Coding Specialist/Coder.	C 1-2 YR	14	71%	\$34,451
51.0719	Clinical Research Coordinator.	CPBA	*	*	*
51.2002	Pharmacy Administration and Pharmacy Policy and Regulatory Affairs.	MA	*	*	*
51.2211	Health Services Administration.	CPBA	*	*	*
51.3802	Nursing Administration.	MA	12	67%	\$79,853
52.0101	Business/Commerce, General.	BA	52	52%	\$56,578
52.0101	Business/Commerce, General.	CPBA	*	*	*
52.0101	Business/Commerce, General.	MA	67	51%	\$62,043
52.0201	Business Administration and Management, General.	BA	1708	57%	\$44,939
52.0201	Business Administration and Management, General.	CPBA	*	*	*
52.0201	Business Administration and Management, General.	MA	1666	51%	\$71,084
52.0201	Business Administration and Management, General.	D	27	15%	*
52.0204	Office Management and Supervision.	BA	13	31%	*
52.0206	Non-Profit/Public/Organizational Management.	BA	12	33%	*
52.0206	Non-Profit/Public/Organizational Management.	CPBA	*	*	*
52.0206	Non-Profit/Public/Organizational Management.	MA	*	*	*
52.0207	Customer Service Management.	C < 1 YR	14	93%	\$44,270
52.0207	Customer Service Management.	BA	*	*	*
52.0209	Transportation/Mobility Management.	C < 1 YR	12	42%	\$53,545
52.0210	Research and Development Management.	CPBA	11	73%	\$73,263
52.0211	Project Management.	CPBA	*	*	*
52.0213	Organizational Leadership.	AA	*	*	*
52.0213	Organizational Leadership.	BA	180	48%	\$56,426
52.0213	Organizational Leadership.	CPBA	33	64%	\$49,600
52.0213	Organizational Leadership.	MA	88	33%	\$60,000
52.0213	Organizational Leadership.	D	18	11%	*
52.0215	Risk Management.	BA	*	*	*
52.0299	Business Administration, Management and Operations, Other.	AA	11	64%	\$42,014
52.0299	Business Administration, Management and Operations, Other.	MA	61	39%	\$54,751

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
52.0301	Accounting.	BA	492	67%	\$49,161
52.0301	Accounting.	CPBA	*	*	*
52.0301	Accounting.	MA	216	70%	\$63,979
52.0302	Accounting Technology/Technician and Bookkeeping.	C < 1 YR	*	*	*
52.0302	Accounting Technology/Technician and Bookkeeping.	C 1-2 YR	16	69%	\$45,144
52.0302	Accounting Technology/Technician and Bookkeeping.	AA	22	77%	\$45,346
52.0304	Accounting and Finance.	BA	*	*	*
52.0305	Accounting and Business/Management.	BA	*	*	*
52.0401	Administrative Assistant and Secretarial Science, General.	C < 1 YR	*	*	*
52.0401	Administrative Assistant and Secretarial Science, General.	C 1-2 YR	33	88%	\$33,675
52.0401	Administrative Assistant and Secretarial Science, General.	AA	70	71%	\$33,540
52.0402	Executive Assistant/Executive Secretary.	C < 1 YR	72	61%	\$24,088
52.0402	Executive Assistant/Executive Secretary.	C 1-2 YR	160	68%	\$29,205
52.0407	Business/Office Automation/Technology/Data Entry.	C < 1 YR	11	82%	\$36,728
52.0407	Business/Office Automation/Technology/Data Entry.	C 1-2 YR	36	69%	\$34,516
52.0501	Business/Corporate Communications, General.	BA	*	*	*
52.0601	Business/Managerial Economics.	BA	78	59%	\$43,509
52.0701	Entrepreneurship/Entrepreneurial Studies.	C < 1 YR	35	54%	\$41,651
52.0701	Entrepreneurship/Entrepreneurial Studies.	AA	*	*	*
52.0701	Entrepreneurship/Entrepreneurial Studies.	BA	30	57%	\$38,000
52.0701	Entrepreneurship/Entrepreneurial Studies.	CPBA	*	*	*
52.0703	Small Business Administration/Management.	BA	*	*	*
52.0803	Banking and Financial Support Services.	C < 1 YR	*	*	*
52.0803	Banking and Financial Support Services.	AA	*	*	*
52.0803	Banking and Financial Support Services.	BA	*	*	*
52.0803	Banking and Financial Support Services.	CPBA	*	*	*
52.1001	Human Resources Management/Personnel Administration, General.	BA	58	66%	\$43,411
52.1001	Human Resources Management/Personnel Administration, General.	CPBA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
52.1001	Human Resources Management/Personnel Administration, General.	MA	23	61%	\$67,090
52.1005	Human Resources Development.	CPBA	*	*	*
52.1005	Human Resources Development.	MA	12	50%	\$77,980
52.1101	International Business/Trade/Commerce.	BA	27	37%	\$62,389
52.1206	Information Resources Management.	BA	*	*	*
52.1207	Knowledge Management.	CPBA	*	*	*
52.1299	Management Information Systems and Services, Other.	CPBA	*	*	*
52.1301	Management Science.	BA	12	33%	*
52.1301	Management Science.	CPBA	48	38%	\$79,738
52.1301	Management Science.	MA	27	48%	\$90,592
52.1301	Management Science.	D	13	0%	*
52.1302	Business Statistics.	BA	177	44%	\$57,904
52.1302	Business Statistics.	MA	68	63%	\$87,289
52.1399	Management Sciences and Quantitative Methods, Other.	MA	67	40%	\$90,395
52.9999	Business, Management, Marketing, and Related Support Services, Other.	C < 1 YR	*	*	*
52.9999	Business, Management, Marketing, and Related Support Services, Other.	BA	*	*	*

Mirroring the growth of Business, Finance, Government Management, and Support Service occupations in the Tennessee economy, almost all public and private institutions in the state offer at least one academic program supporting an in-demand occupation in the career cluster. The University of Tennessee at Martin offers the only master’s level program in Strategic Communication in the state. This program prepares students with an array of skills to enter the dynamic world of corporate messaging. Middle Tennessee State University’s Recording Industry program continues to generate national appeal as students learn about the operational and financial side of the state’s iconic music industry. The wide array of occupations and programs supporting this cluster are evident across Tennessee colleges.

High School CTE Business, Finance, Government Management, & Support Service Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
44.0499	Public Administration, Other	CTE HS	61	57%	\$38,436
51.2211	Health Services Administration.	CTE HS	24	46%	\$48,333
52.0204	Office Management and Supervision.	CTE HS	1,642	53%	\$38,923
52.0302	Accounting Technology/Technician and Bookkeeping.	CTE HS	468	54%	\$38,196
52.1005	Human Resources Development.	CTE HS	*	*	*

Over 2,000 high school graduates concentrated in a Business, Finance, Government Management, and Support Services aligned training program in 2021-22. The largest program was relating to Office Management and Supervision, while the program paying the highest first-year wage was the Health Services Administration pathway which graduated 24 students earning over \$48,000.

In 2022-23, over 8,000 Tennessee high school concentrators participated in Business Management, Office Management, Accounting, and Banking and Finance programs of study. Through these pathways, students can earn business-related industry credentials, too, including the Microsoft Office Specialist Power Point Associate certification.

Business, Finance, Government Management, and Support Services Apprenticeships 2022

CIP Code	Program Title	Number of Completers 2022
52.0401	Administrative Assistant and Secretarial Science, General.	*
43.0399	Homeland Security, Other.	14

Cluster Six: Sales and Marketing Occupations

The sales and marketing career cluster includes occupations that plan, manage, and perform marketing activities or are otherwise responsible for sales of goods and services to consumers. Tennessee’s private retail trade industry employs 343,800 people, which reflects a net gain of approximately 6,700 jobs (2.0 percent) since 2018.⁴⁴

Sales occupations increasingly require skills with data analysis software, database querying software, enterprise planning software, and customer relationship management software. After the onset of the pandemic, many retail operations in Tennessee began offering pick-up and delivery of products at unprecedented rates, necessitating a rapid change for skills in the marketplace. First-line supervisors of retail sales workers are in-demand in every region of Tennessee. First-line supervisors of retail sales workers will likely continue to be on the forefront of managing the buy online, pick up in store (BOPIS) and/or click-and-collect processes in Tennessee.

This career cluster prepares students for marketing and sales positions which are prevalent in a vast array of other industries outside of retail sales too. Marketing managers and sales managers, for example, often gain employment in headquarters operations or consulting firms.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-2021	Marketing Managers		5	\$75,266	Bachelor's degree	*	
11-2022	Sales Managers		7	\$76,167	Bachelor's degree	*	
13-1020	Buyers and Purchasing Agents		1	\$37,965	Bachelor's degree	*	
13-2052	Personal Financial Advisors	X	5	\$38,353	Bachelor's degree		
27-1026	Merchandise Displayers and Window Trimmers		5	\$27,948	High school diploma or equivalent	*	
41-1011	First-Line Supervisors of Retail Sales Workers	X	9	\$29,629	High school diploma or equivalent		
41-1012	First-Line Supervisors of Non-Retail Sales Workers		3	\$48,153	High school diploma or equivalent	*	
41-2021	Counter and Rental Clerks		4	\$24,890	No formal educational credential		

⁴⁴ U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, NAICS 44-45 Retail Trade, June 2018 - June 2023

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
41-2022	Parts Salespersons		2	\$23,247	No formal educational credential	*	
41-3011	Advertising Sales Agents	X	2	\$28,501	High school diploma or equivalent		
41-3031	Securities, Commodities, and Financial Services Sales Agents		2	\$41,695	Bachelor's degree		
41-3091	Sales Representatives of Services, Except Advertising, Insurance, Financial Services, and Travel	X	8	\$35,066	High school diploma or equivalent	*	
41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products		7	\$42,249	Bachelor's degree	*	#
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products		6	\$34,217	High school diploma or equivalent	*	
41-9022	Real Estate Sales Agents	X	7	\$23,636	High school diploma or equivalent		
53-7065	Stockers and Order Fillers		2	\$25,704	High school diploma or equivalent	*	

Sales and Marketing Aligned Academic Programs

Postsecondary Sales and Marketing Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
09.0903	Advertising.	BA	68	57%	\$35,681
09.0903	Advertising.	MA	*	*	*
52.0208	E-Commerce/Electronic Commerce.	MA	21	67%	\$53,150
52.1401	Marketing/Marketing Management, General.	BA	739	60%	\$42,456
52.1401	Marketing/Marketing Management, General.	MA	*	*	*
52.1803	Retailing and Retail Operations.	C 1-2 YR	*	*	*
52.1804	Selling Skills and Sales Operations.	C < 1 YR	16	56%	\$41,218
52.1902	Fashion Merchandising.	BA	*	*	*

The programs in the Sales and Marketing cluster prepare students with the skills to engage in today's commercial marketplace. The University of Tennessee at Martin has a Bachelor of marketing with concentrations in professional sales and strategic marketing. Nashville State Community College has a certificate program in retail management equipping students to interface directly with customers. Many programs within the cluster incorporate community-based learning opportunities that allow students to gain real-world experience and connections as they enter the workforce, like Austin Peay State University's marketing program.

High School CTE Sales and Marketing Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
52.0701	Entrepreneurship/Entrepreneurial Studies.	CTE HS	547	52%	\$39,625
52.1401	Marketing/Marketing Management, General.	CTE HS	2,051	50%	\$39,345

Over 2,500 high school CTE concentrators graduated in the marketing cluster in 2021-22 with the majority coming from the marketing management program. In 2022-23, the high school CTE marketing pathway enrolls over 6,000 Tennessee high school concentrators across three programs of study: Marketing Management, Entrepreneurship, and Supply Chain

Management. Collierville High School students enrolled in supply chain management had the opportunity to earn the Certified Logistics Associate certification⁴⁵ to support the demand for the logistics workforce in Southwest Tennessee.

Sales and Marketing Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
52.1909	Special Products Marketing Operations.	*

⁴⁵ Tennessee Department of Education, Certified Logistics Associate (CLA), https://www.tn.gov/content/dam/tn/education/ccte/eps/credentials/cte_sic_CertifiedLogisticsAssoc.pdf

Cluster Seven: Health Sciences Occupations

Nationally, employment in the healthcare sector is projected to experience 1.8 million job openings annually from 2022 to 2032, attributable to the aging demographics.^{46,47} Tennessee is 26th nationwide and fifth in the southeast for its proportion of residents aged 65 and older. This aging is indicative of broader trends necessitating increased healthcare services.⁴⁸ As the Baby Boomer cohort transitions into retirement and population growth decelerates, the difficulty of replenishing the workforce is compounded.⁴⁹

A comparison of new business applications shows that Tennessee's healthcare sector business applications are up relative to the national average.⁵⁰ The state's health sciences occupations demonstrate a concentration within local service providers, including hospitals, outpatient clinics, and long-term care facilities. These roles commonly necessitate formal qualifications, such as degrees or certificates, and often a license for practice. Tennessee's demand for allied health professionals is on an upward trend, highlighting a sector comprising healthcare workers who support primary care providers.

TNECD's targeted life sciences industry sector encapsulates critical segments like biosciences logistics and distribution, medical devices and equipment, pharmaceuticals, and research and testing laboratories. Despite the exclusion of local healthcare services, there is a symbiotic relationship between these targeted segments and the broader healthcare industry, with each benefiting from shared regional assets. These assets include a network of tertiary institutions, premier research facilities, and a skilled workforce, which collectively underpin the state's life sciences infrastructure.

Statewide, there is a notable demand for mid-level technically skilled practitioners, specifically for licensed practical and licensed vocational nurses, physical therapist assistants, dental assistants, medical assistants, and phlebotomists. These roles are critical in the provision of patient care and functioning of healthcare facilities. They require specialized training, typically obtained through postsecondary nondegree awards or associate degrees. These professionals support the medical infrastructure by providing essential services to maintain patient health, aid in the management of chronic conditions, and contribute to the preventative care imperative in an era of demographic transition.

⁴⁶ U.S. Bureau of Labor Statistics, [Occupational Outlook Handbook, Healthcare Occupations](#)

⁴⁷ Much of the state's population increase is driven by domestic net migration gains—more people moving into the state than moving out. -- Tennessee State Data Center [TN 2022 Population Gains Pushed by Record Domestic Net Migration](#)

⁴⁸ Consumer Affairs, Elderly Population in U.S. by State, 2023

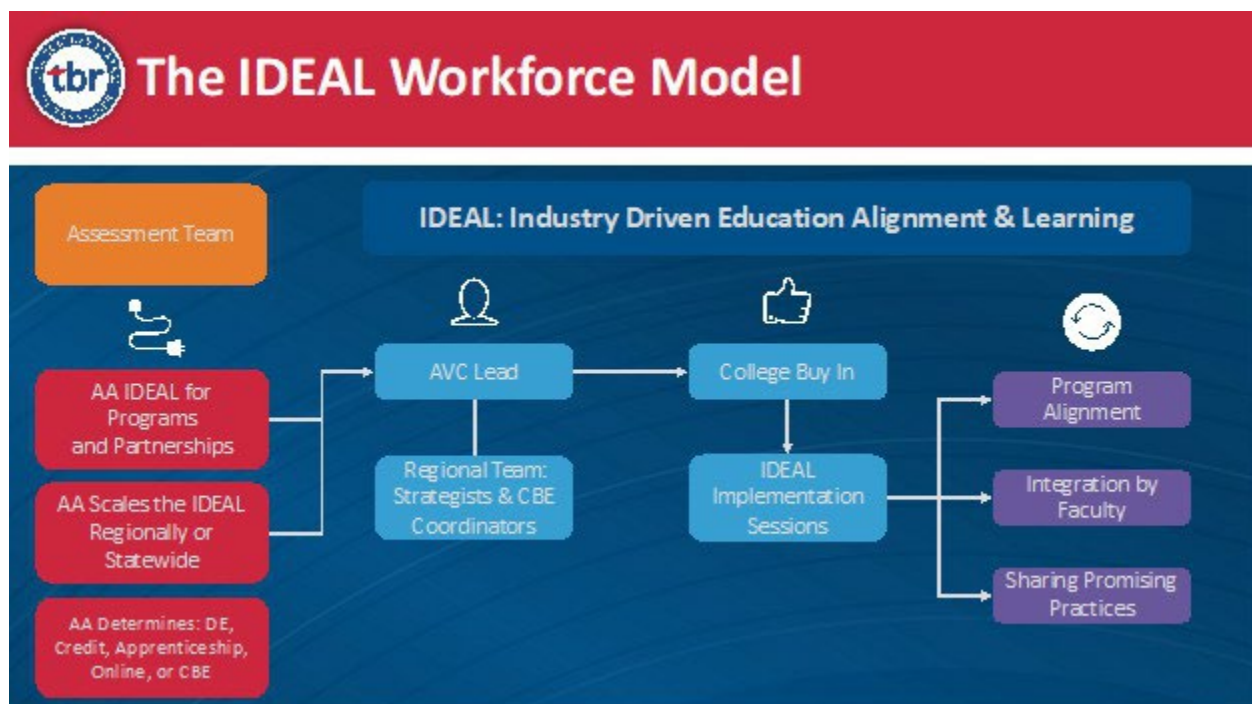
⁴⁹ Boyd Center for Business and Economic Research, *An Economic Report to the Governor of the State of Tennessee*, 2023

⁵⁰ Boyd Center for Business and Economic Research, *An Economic Report to the Governor of the State of Tennessee*, 2024

The Tennessee Board of Regents's IDEAL Workforce Model

The Tennessee Board of Regents (TBR) delivers comprehensive, state-of-the-art training services for new and existing business and industry workforce partners to increase the number of workforce training hours produced by TBR, its institutions, and the number of companies served. This comprehensive approach ensures that TBR colleges are uniquely positioned to rapidly respond to the workforce needs of existing and emerging industries across the state.

TBR has created the **IDEAL Workforce Model**, Industry-Driven Education Aligned Learning, to scale regional or statewide training programs for industry partners that are referred to TBR by entities such as the Governor's Office, the Legislature, state agencies like Economic and Community Development or Department of Labor and Workforce Development, and the Chancellor's Office. This work is supported by collaborative efforts across TBR's External Affairs' Center for Workforce Development, the Office of Academic Affairs, and the Center for Apprenticeships divisions.



The Industry-Driven Education Aligned Learning (IDEAL) model is used by TBR after a regional assessment team completes the intake process with a referred company. That team works to assess industry needs, identify aligned training, or create custom training. This regional assessment team also identifies if the training can be provided as a traditional academic program, short-term workforce training, registered apprenticeship, dual enrollment opportunity, competency-based education, or as a multimodal approach that incorporates two or more of these strategies.

The workforce opportunity is presented to all college Presidents, Chief Academic Officers, and Directors for Workforce Development in a virtual statewide meeting. The industry partner is given time to present their workforce need, the in-kind contributions they will provide to catalyze the new training program, and the facility, equipment, and faculty requirements for training if they have offered it in another context (e.g., another state or region). A champion from TBR summarizes the viable training options to the colleges, such as apprenticeship or dual enrollment. Over subsequent weeks, college presidents are asked to signal their interest in exploring the opportunity further and to identify a campus lead. When a college chooses to participate in the effort, TBR's External Affairs and Academic Affairs staff lead them through a series of facilitated implementation sessions where faculty and workforce development staff work to embed or create new programs and/or training to meet the industry demand.

TBR has used this model to successfully create new training programs for Amazon and their AWS certifications, the National Tile Contractors Association in collaboration with the TN Department of Economic & Community Development, the TN Forestry Association in collaboration with the TN Department of Agriculture, the Direct Support Professional Program in collaboration with TennCare, the Floor Covering Education Foundation, Massage Therapy programs in collaboration with The Ingram Group, and the University of Tennessee's Grow Your Own Teacher Apprenticeship.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
19-5011	Occupational Health and Safety Specialists		7	\$50,877	Bachelor's degree	*	
29-1031	Dietitians and Nutritionists		2	\$39,276	Bachelor's degree		
29-1071	Physician Assistants		6	\$80,670	Master's degree		
29-1122	Occupational Therapists		2	\$69,832	Master's degree		
29-1123	Physical Therapists		3	\$70,626	Doctoral or professional degree		
29-1126	Respiratory Therapists		5	\$48,462	Associate degree		
29-1127	Speech-Language Pathologists	X	7	\$52,259	Master's degree		
29-1141	Registered Nurses		4	\$54,486	Bachelor's degree		
29-1151	Nurse Anesthetists		1	\$135,887	Master's degree		
29-1171	Nurse Practitioners		6	\$62,741	Master's degree		
29-1292	Dental Hygienists		1	\$47,693	Associate degree		
29-2031	Cardiovascular Technologists and Technicians		1	\$33,216	Associate degree		
29-2032	Diagnostic Medical Sonographers		6	\$54,196	Associate degree		
29-2042	Emergency Medical Technicians		2	\$27,833	Postsecondary nondegree award		
29-2052	Pharmacy Technicians		8	\$28,760	High school diploma or equivalent		
29-2055	Surgical Technologists	X	6	\$40,456	Postsecondary nondegree award		
29-2057	Ophthalmic Medical Technicians		1	\$30,187	Postsecondary nondegree award		
29-2061	Licensed Practical and Licensed Vocational Nurses	X	9	\$36,873	Postsecondary nondegree award		
29-2081	Opticians, Dispensing		1	\$29,024	High school diploma or equivalent		
31-1131	Nursing Assistants		3	\$26,850	Postsecondary nondegree award		
31-2011	Occupational Therapy Assistants		3	\$47,282	Associate degree		
31-2021	Physical Therapist Assistants	X	9	\$46,871	Associate degree		
31-9011	Massage Therapists	X	3	\$32,572	Postsecondary nondegree award		

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
31-9091	Dental Assistants	X	9	\$32,692	Postsecondary nondegree award		
31-9092	Medical Assistants	X	9	\$28,974	Postsecondary nondegree award		
31-9093	Medical Equipment Preparers	X	1	\$26,101	High school diploma or equivalent		
31-9097	Phlebotomists	X	8	\$29,229	Postsecondary nondegree award		
31-9099	Healthcare Support Workers, All Other		5	\$26,002	High school diploma or equivalent		

Health Sciences Aligned Academic Programs

Postsecondary Health Sciences Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
19.0501	Foods, Nutrition, and Wellness Studies, General.	BA	24	71%	\$34,290
19.0504	Human Nutrition.	CPBA	*	*	*
30.1901	Nutrition Sciences.	BA	*	*	*
30.1901	Nutrition Sciences.	CPBA	*	*	*
30.1901	Nutrition Sciences.	MA	19	53%	\$50,252
30.1901	Nutrition Sciences.	D	*	*	*
51.0202	Audiology/Audiologist.	D	38	21%	\$74,319
51.0203	Speech-Language Pathology/Pathologist.	MA	47	55%	\$55,912
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist.	MA	88	50%	\$51,899
51.0204	Audiology/Audiologist and Speech-Language Pathology/Pathologist.	D	*	*	*
51.0299	Communication Disorders Sciences and Services, Other.	CPBA	12	42%	\$59,631

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
51.0601	Dental Assisting/Assistant.	C < 1 YR	*	*	*
51.0601	Dental Assisting/Assistant.	C 1-2 YR	122	81%	\$29,788
51.0601	Dental Assisting/Assistant.	AA	17	82%	\$29,017
51.0602	Dental Hygiene/Hygienist.	AA	45	82%	\$54,350
51.0602	Dental Hygiene/Hygienist.	BA	73	70%	\$57,539
51.0707	Health Information/Medical Records Technology/Technician.	C < 1 YR	29	52%	\$24,045
51.0707	Health Information/Medical Records Technology/Technician.	C 1-2 YR	105	76%	\$31,590
51.0801	Medical/Clinical Assistant.	C < 1 YR	27	74%	\$28,046
51.0801	Medical/Clinical Assistant.	C 1-2 YR	85	69%	\$30,979
51.0801	Medical/Clinical Assistant.	AA	*	*	*
51.0803	Occupational Therapist Assistant.	AA	59	76%	\$33,482
51.0805	Pharmacy Technician/Assistant.	C < 1 YR	15	87%	\$29,472
51.0805	Pharmacy Technician/Assistant.	C 1-2 YR	82	65%	\$30,313
51.0806	Physical Therapy Assistant.	AA	79	81%	\$42,688
51.0809	Anesthesiologist Assistant.	AA	*	*	*
51.0901	Cardiovascular Technology/Technologist.	AA	12	92%	\$50,786
51.0904	Emergency Medical Technology/Technician (EMT Paramedic).	C < 1 YR	474	84%	\$46,534
51.0904	Emergency Medical Technology/Technician (EMT Paramedic).	C 1-2 YR	149	84%	\$61,942
51.0904	Emergency Medical Technology/Technician (EMT Paramedic).	AA	44	93%	\$67,358
51.0905	Nuclear Medical Technology/Technologist.	C < 1 YR	*	*	*
51.0905	Nuclear Medical Technology/Technologist.	C 1-2 YR	10	40%	\$65,484
51.0908	Respiratory Care Therapy/Therapist.	AA	77	84%	\$59,695
51.0908	Respiratory Care Therapy/Therapist.	BA	41	63%	\$57,801
51.0909	Surgical Technology/Technologist.	C 1-2 YR	95	73%	\$48,405
51.0909	Surgical Technology/Technologist.	AA	42	83%	\$44,677
51.0910	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician.	C 1-2 YR	19	89%	\$65,493
51.0910	Diagnostic Medical Sonography/Sonographer and Ultrasound Technician.	BA	*	*	*
51.0912	Physician Associate/Assistant.	MA	222	27%	\$87,321
51.1001	Blood Bank Technology Specialist.	C < 1 YR	18	83%	\$32,153
51.1009	Phlebotomy Technician/Phlebotomist.	C < 1 YR	33	67%	\$24,651
51.1012	Sterile Processing Technology/Technician.	C < 1 YR	13	100%	\$46,194
51.1012	Sterile Processing Technology/Technician.	C 1-2 YR	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
51.1801	Opticianry/Ophthalmic Dispensing Optician.	AA	17	88%	\$34,770
51.1803	Ophthalmic Technician/Technologist.	AA	*	*	*
51.2202	Environmental Health	AA	*	*	*
51.2202	Environmental Health	BA	*	*	*
51.2202	Environmental Health	D	*	*	*
51.2306	Occupational Therapy/Therapist.	MA	128	50%	\$59,335
51.2306	Occupational Therapy/Therapist.	D	23	61%	\$60,650
51.2308	Physical Therapy/Therapist.	D	163	63%	\$69,146
51.3101	Dietetics/Dietitian.	BA	14	21%	*
51.3101	Dietetics/Dietitian.	CPBA	13	23%	*
51.3102	Clinical Nutrition/Nutritionist.	MA	34	53%	\$44,607
51.3203	Nursing Education.	CPBA	*	*	*
51.3501	Massage Therapy/Therapeutic Massage.	C < 1 YR	21	48%	\$29,987
51.3501	Massage Therapy/Therapeutic Massage.	C 1-2 YR	*	*	*
51.3801	Registered Nursing/Registered Nurse.	AA	923	89%	\$65,179
51.3801	Registered Nursing/Registered Nurse.	BA	2457	68%	\$68,386
51.3801	Registered Nursing/Registered Nurse.	CPBA	10	50%	\$88,744
51.3801	Registered Nursing/Registered Nurse.	MA	368	69%	\$84,905
51.3804	Nurse Anesthetist.	D	25	8%	*
51.3805	Family Practice Nurse/Nursing.	CPBA	12	50%	\$109,872
51.3805	Family Practice Nurse/Nursing.	MA	164	50%	\$85,751
51.3805	Family Practice Nurse/Nursing.	EDS	20	10%	*
51.3805	Family Practice Nurse/Nursing.	D	43	65%	\$100,835
51.3808	Nursing Science.	D	*	*	*
51.3809	Pediatric Nurse/Nursing.	CPBA	*	*	*
51.3809	Pediatric Nurse/Nursing.	MA	*	*	*
51.3810	Psychiatric/Mental Health Nurse/Nursing.	CPBA	19	37%	\$111,350
51.3810	Psychiatric/Mental Health Nurse/Nursing.	MA	13	77%	\$91,234
51.3810	Psychiatric/Mental Health Nurse/Nursing.	EDS	*	*	*
51.3810	Psychiatric/Mental Health Nurse/Nursing.	D	*	*	*
51.3818	Nursing Practice.	BA	35	66%	\$46,244
51.3818	Nursing Practice.	D	147	56%	\$104,036
51.3899	Registered Nursing, Nursing Administration, Nursing Research and Clinical Nursing, Other.	BA	*	*	*
51.3901	Licensed Practical/Vocational Nurse Training.	C < 1 YR	114	61%	\$30,354
51.3901	Licensed Practical/Vocational Nurse Training.	C 1-2 YR	1107	77%	\$47,280
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide.	C < 1 YR	51	71%	\$25,824

Tennessee colleges and universities offer a myriad of academic programs to support the growing demand for skilled professionals in the Health Sciences Cluster. Like most states in the country, Health Sciences careers are a growing part of the Tennessee economy, but demand continues to run ahead of supply. Public and private institutions continue to expand their capacity to train more students to enter these needed occupations.

Beyond increasing individual capacity, institutions are also working strategically to create partnerships to meet the needs of Tennessee. The University of Tennessee Southern (UTS) and the University of Tennessee Health Sciences Center have a newly approved joint Bachelor of Science in Nursing (BSN) program that builds on the existing strengths of the BSNs at both schools to share resources more effectively across UT campuses. The partnership will strengthen UTS's program, which serves the Southern Middle region and provides nurses for rural and underserved populations.

High School CTE Health Sciences Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide.	CTE HS	2,424	52%	\$38,783

Over 2,400 high school CTE concentrators graduated in the nursing pathway in 2021-22 with over half found employed in Tennessee's workforce. This program offers high school students the opportunity to earn their CNA and LPN certifications in high school. The Health Science pathway is the most popular among high school students with 18,000 students enrolled across Diagnostic Services, Therapeutic Services, Emergency Services, Nursing Services, and Sport and Human Performance programs. In 2024-25, schools will have the option to offer a new program, Behavioral Health, to prepare for the growing mental health medicine needs. Elizabethton High School offers students opportunities in clinical settings as well as the opportunity to earn industry credentials as a Certified Nursing Assistant (CNA).

Health Sciences Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
51.0707	Health Information/Medical Records Technology/Technician.	*
51.0801	Medical/Clinical Assistant.	22
51.0909	Surgical Technology/Technologist.	*
51.3902	Nursing Assistant/Aide and Patient Care Assistant/Aide.	26

Governor's Investment in Vocational Education (GIVE) Nashville State



The Governor's Investment in Vocational Education (GIVE) program aims to create long-term partnerships between Tennessee Colleges of Applied Technology (TCATs), community colleges, industries, economic development/workforce agencies, and K-12 schools. Its main goal is to identify and address the "skills gaps" present in the local workforce. GIVE is a competitive grant that awards of up to \$1 million to local higher education entities to facilitate collaboration between K12, higher education, and workforce partners.

Nashville State Community College (NSCC) launched an emergency medical services program to equip students from two area high schools with skills and credentials to help them succeed in the workforce or continue their postsecondary studies. Building on existing initiatives at Creek Wood High School in Charlotte and Dickson County High School in Dickson, this GIVE grant has created conditions to increase instruction and enrollment, purchase necessary equipment, and offer a broader range of student credentials. One of the program's key components is the EMS Practicum, which allows students to work alongside EMS professionals in the county EMS service and learn about the 911 call center. With the help of GIVE 2.0 funding, the program aims to establish a pipeline of future EMS professionals who will have the necessary skills to succeed quickly in this in-demand field.

Cluster Eight: Human Services Occupations

Human services occupations focus on societal and individual well-being. Nationally, employment in community and social occupations is projected to grow faster than the national average and experience 281,600 annual openings from 2022 to 2032.⁵¹ As our society grows and changes, demand for occupations focusing on nutritional, behavioral, and mental health will likely increase.

Social and Human Service Assistants, Mental Health and Substance Abuse Social Workers, Hairdressers, Hairstylists, and Cosmetologists, Educational, Guidance, and Career Counselors and Advisors, and Skincare Specialists are all in-demand statewide.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
21-1012	Educational, Guidance, and Career Counselors and Advisors	X	6	\$38,462	Master's degree		
21-1013	Marriage and Family Therapists		3	\$31,941	Master's degree		
21-1019	Counselors, All Other		1	\$25,915	Master's degree		
21-1022	Healthcare Social Workers		6	\$36,976	Master's degree		
21-1023	Mental Health and Substance Abuse Social Workers	X	3	\$30,737	Master's degree		
21-1092	Probation Officers and Correctional Treatment Specialists		1	\$36,031	Bachelor's degree		
21-1093	Social and Human Service Assistants	X	7	\$26,193	High school diploma or equivalent		
25-1125	History Teachers, Postsecondary		1	\$44,522	Doctoral or professional degree		
39-5012	Hairdressers, Hairstylists, and Cosmetologists	X	5	\$20,559	Postsecondary nondegree award		
39-5094	Skincare Specialists	X	1	\$21,173	Postsecondary nondegree award		
39-9041	Residential Advisors		1	\$24,260	High school diploma or equivalent		

⁵¹ U.S. Bureau of Labor Statistics, [Occupational Outlook Handbook, Community and Social Service Occupations](#)

Human Services Aligned Academic Programs

Postsecondary Human Services Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
05.0210	Disability Studies.	BA	*	*	*
12.0401	Cosmetology/Cosmetologist, General.	C < 1 YR	48	54%	\$19,490
12.0401	Cosmetology/Cosmetologist, General.	C 1-2 YR	400	54%	\$20,078
12.0402	Barbering/Barber.	C < 1 YR	*	*	*
12.0402	Barbering/Barber.	C 1-2 YR	34	41%	\$13,634
12.0409	Aesthetician/Esthetician and Skin Care Specialist.	C < 1 YR	18	61%	\$32,571
12.0410	Nail Technician/Specialist and Manicurist.	C < 1 YR	13	38%	\$16,583
12.0413	Cosmetology, Barber/Styling, and Nail Instructor.	C < 1 YR	*	*	*
12.0499	Cosmetology and Related Personal Grooming Arts, Other.	C < 1 YR	27	67%	\$23,071
13.1101	Counselor Education/School Counseling and Guidance Services.	CPBA	*	*	*
13.1101	Counselor Education/School Counseling and Guidance Services.	MA	170	69%	\$48,510
13.1101	Counselor Education/School Counseling and Guidance Services.	EDS	31	77%	\$46,295
13.1102	College Student Counseling and Personnel Services.	MA	18	50%	\$52,000
13.1102	College Student Counseling and Personnel Services.	D	*	*	*
19.0707	Family and Community Services.	BA	10	20%	*
19.0707	Family and Community Services.	CPBA	12	83%	\$39,947
24.0101	Liberal Arts and Sciences/Liberal Studies.	CPBA	*	*	*
30.1101	Gerontology.	CPBA	*	*	*
30.2001	International/Globalization Studies.	BA	15	53%	\$26,571
42.2703	Developmental and Child Psychology.	BA	*	*	*
42.2799	Research and Experimental Psychology, Other.	BA	309	63%	\$29,841
42.2799	Research and Experimental Psychology, Other.	MA	*	*	*
42.2799	Research and Experimental Psychology, Other.	D	16	6%	*
42.2803	Counseling Psychology.	BA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
42.2803	Counseling Psychology.	CPBA	*	*	*
42.2804	Industrial and Organizational Psychology.	BA	14	50%	\$50,907
42.2806	Educational Psychology.	CPBA	*	*	*
42.2813	Applied Psychology.	BA	*	*	*
44.0000	Human Services, General.	BA	40	58%	\$33,377
44.0000	Human Services, General.	MA	13	54%	\$39,580
44.0201	Community Organization and Advocacy.	AA	*	*	*
44.0701	Social Work.	BA	418	65%	\$36,970
44.0701	Social Work.	MA	567	62%	\$47,692
44.0701	Social Work.	D	18	11%	*
44.0799	Social Work, Other.	CPBA	97	65%	\$49,296
45.0201	Anthropology, General.	MA	20	30%	\$44,917
45.0201	Anthropology, General.	D	*	*	*
45.0299	Anthropology, Other.	CPBA	*	*	*
45.0301	Archeology.	MA	*	*	*
45.0701	Geography.	MA	*	*	*
45.0701	Geography.	D	*	*	*
45.0901	International Relations and Affairs.	MA	14	57%	\$39,498
45.0999	International Relations and National Security Studies, Other.	CPBA	*	*	*
45.1001	Political Science and Government, General.	MA	*	*	*
45.1001	Political Science and Government, General.	D	*	*	*
45.1101	Sociology, General.	CPBA	*	*	*
45.1101	Sociology, General.	MA	19	37%	\$40,962
45.1101	Sociology, General.	D	*	*	*
51.1501	Substance Abuse/Addiction Counseling.	C < 1 YR	*	*	*
51.1503	Clinical/Medical Social Work.	CPBA	*	*	*
51.1504	Community Health Services/Liaison/Counseling.	BA	*	*	*
51.1505	Marriage and Family Therapy/Counseling.	MA	83	22%	\$48,489
51.1508	Mental Health Counseling/Counselor.	MA	89	49%	\$44,566
51.2314	Rehabilitation Science.	BA	24	67%	\$23,711
51.2316	Horticulture Therapy/Therapist.	CPBA	*	*	*
54.0101	History, General.	MA	47	51%	\$33,772
54.0101	History, General.	D	11	64%	\$45,000
54.0105	Public/Applied History.	D	*	*	*
54.0108	Military History.	MA	*	*	*

As Tennessee’s population grows, Tennessee’s institutions offer an increasing number of academic programs across training levels to support in-demand occupations in the Human Services Cluster. School counselors are in-demand and Counselor Education/School Counseling and Guidance Services programs employ more than sixty percent of graduates in Tennessee with wages exceeding the state median.

Across academic institutions and credential levels, students have opportunities to learn the skills needed to enter careers that serve our communities. Social workers are needed across the state and postsecondary institutions produced over 900 social worker graduates in 2021-22 at the baccalaureate and master’s degree levels. A challenge to recruitment in this occupational area may be relatively low wages for the training requirements.

In addition to degree programs offered across community colleges and universities, TCATs across the state have added the Barbering and Cosmetology Instructor Training program, including Chattanooga, Dickson, Elizabethton, Hohenwald, McMinnville, Murfreesboro, Northwest, and Oneida.

High School CTE Human Services Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
12.0401	Cosmetology/Cosmetologist, General.	CTE HS	1,164	54%	\$37,089
12.0402	Barbering/Barber.	CTE HS	48	71%	\$35,798
19.0799	Human Development, Family Studies, and Rel.	CTE HS	1,479	52%	\$38,416

The Human Services career cluster offers multiple pathways to expose high school students to careers in human services. The cosmetology and human development programs graduated more than 1,000 HS CTE concentrators each in 2021-22. In 2022-23, programs in this cluster enrolled over 8,000 Tennessee high school concentrators across four programs of study: Human and Social Sciences, Dietetics and Nutrition, Cosmetology, and Barbering. Licenses are required for cosmetology and barbering occupations and students may begin logging hours in pursuit of licenses while in high school. Bearden High School offers Dietetics & Human & Social Sciences pathway, where students can gain hands-on experiences in human services careers as part of the high school’s they are new academy model.

Tennessee Investment in Student Achievement (TISA) Student-Based Funding Formula

In 2022, Tennessee policymakers restructured its student-based, public school funding formula, called the Tennessee Investment in Student Achievement (TISA) program. Under TISA, a portion of public education funding is allocated to districts enrolling students in high-wage, in-demand, high skill programs of study. Each CTE program will be categorized into tiers, established by State Board of Education rule. This tiered system, based on statewide employment needs, encourages school districts to offer programs of study leading to long-term and emerging local employment needs based on in-demand Standard Occupational Classification (SOC) codes. The formula will focus heavily on in-demand fields for the State of Tennessee. Additional funding is offered for students earning industry credentials from the “Valued” and “Preferred” tiers on the state-promoted list.



Cluster Nine: Education and Training Occupations

The education and training career cluster includes educators, administrators, trainers, counselors, and other learning support services occupations. Recruitment and retention are critical for a high-quality and consistent teaching workforce. Across the nation and in Tennessee, teacher shortages and retention are a concern. In 2023, Governor Lee signed the Teacher Paycheck Protection Act, which will give teachers the largest pay raise in state history. This Act continues Governor Lee's commitment to increase teacher salaries while working to recruit and retain highly qualified teachers.⁵²

Tennessee is pioneering new ways to develop teacher pipelines and ensure that all schools are staffed with high-quality educators. Tennessee is the first state approved by the U.S. Department of Labor to establish a registered apprenticeship program for teaching in the country. Tennessee's teacher apprenticeship program aligns with leading practices in teacher preparation and development with the rigors and funding of the national registered apprenticeship process.⁵³

The Tennessee Department of Education (TDOE), in partnership with the Tennessee Education Research Alliance (TERA) at Vanderbilt University, conducts an annual Tennessee Educator Survey (TES), to understand the experience of educators across Tennessee. The results from the 2023 TES indicated that 78 percent of survey respondents plan to continue teaching in their current school next year, up slightly from 77 percent in 2022.⁵⁴

The TES also highlights several initiatives in Tennessee aimed at providing for individual student needs that may be impacted by a lack of qualified educators. Tennessee instituted the **Tennessee Accelerating Literacy and Learning Corps** (TN ALL Corps), a research-based high-dosage, low-ratio tutoring program for elementary and middle school. Following its second year of implementation, the TES revealed that educators largely viewed the program as enhancing student learning, but approximately 58 percent of administrators identified a shortage of available tutors as a barrier to implementing the TN ALL Corps tutoring program within their schools.⁵⁵ Further, TDOE's **Innovative High Schools Model** aims to prepare students for success after graduation through participation in local programs aligned to in-demand careers. CTE teachers, reported through the TES, indicate significant interest in these programs from students.

While efforts exist to mitigate the challenges experienced in the education and training cluster, needs persist to support the education enterprise.

⁵² [Teacher Paycheck Protection Act](#)

⁵³ Tennessee Department of Education, [Grow Your Own](#)

⁵⁴ Tennessee Department of Education, [2023 Tennessee Educator Survey](#)

⁵⁵ Tennessee Department of Education, [2023 Tennessee Educator Survey](#)

Grow Your Own Growing Supply for High-Quality Teachers

In Tennessee, as well as around the nation, educators are in-demand. In response to the growing need, Tennessee's Grow Your Own initiative supports partnerships between Educator Preparation Providers (EPPs) and school districts to provide innovative, no-cost pathways to the teaching profession and continues to build pipelines of qualified teachers and school district professionals.

In January 2022, Tennessee was the first state to be approved by the US Department of Labor to establish a permanent Grow Your Own (GYO) model. Clarksville-Montgomery County School System and Austin Peay State University's Teacher Residency program was the first registered apprenticeship program for teaching in the country. Tennessee was the first state to sponsor Teacher Occupation Apprentice programs between school districts and Educator Preparation Providers (EPPs) to expand the teacher pipeline and address educator shortages.

Tennessee invested \$20 million to support the Grow Your Own Center as a partnership between the Tennessee Department of Education and the University of Tennessee, which is dedicated to supporting and scaling best practices around the state. There are currently 9 EPPs that are part of the GYO initiative, and each program is adapted based on the needs of the aspiring educators and local workforce.

- Arete Memphis Montessori Residency
- Austin Peay State University
- Lincoln Memorial University
- Lipscomb University
- University of Memphis
- University of Tennessee, Chattanooga
- University of Tennessee, Knoxville
- University of Tennessee, Martin
- University of Tennessee Southern

In November 2023, Tennessee's State Board of Education (SBE) began forming an Educator Licensure Review Committee to review current rules and policies governing educator licensure, including strengths, challenges, and potential changes. The Committee will include representation from educators, district and state education leaders, and legislators from across the state. The Committee will address relevant board rules and educator licensure requirements aiming to identify recommendations to ensure that the licensure system and policies meet the needs in Tennessee.⁵⁶

⁵⁶ Tennessee State Board of Education, Tennessee Board of Education Seeks to Develop and Educator Licensure Review Committee, November 30, 2023, retrieved from <https://www.tn.gov/sbe/news/2023/11/30/tennessee-state-board-of-education-seeks-to-develop-an-educator-licensure-review-committee.html>



TDOE is actively working with stakeholders across Tennessee to operationalize this new formula component. During a quarterly statewide CTE director meeting, administrators were asked to connect SOC codes from their local labor market information to high school programs of study. The directors were asked to consider information gleaned from program advisory councils during the Comprehensive Local Needs Assessment (CLNA) process in fall 2023. The CLNA process requires CTE Directors to review current program offerings in line with local employment needs. They are also asked to determine the number of students enrolled in those programs to identify if more career exploration is needed to help students choose a program of study. Postsecondary and business representatives gathered to share information relevant to their program and employment needs. This allowed for directors to capture emerging trends in employment that will inform their program of study offerings in the coming school years.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-9033	Education Administrators, Postsecondary		3	\$66,289	Master's degree		
25-1194	Career/Technical Education Teachers, Postsecondary	X	3	\$39,132	Bachelor's degree		
25-1199	Postsecondary Teachers, All Other		4	\$35,513	Doctoral or professional degree		
25-2011	Preschool Teachers, Except Special Education		4	\$22,499	Associate degree		
25-3021	Self-Enrichment Teachers	X	3	\$21,641	High school diploma or equivalent		
25-3099	Teachers and Instructors, All Other		3	\$31,087	Bachelor's degree		
25-4022	Librarians and Media Collections Specialists		2	\$41,310	Master's degree		

Education and Training Aligned Academic Programs

Tennessee’s public and private institutions have a bevy of programs meant to prepare students to address needs in education and training professions. Most in-demand occupations in this cluster require at least a bachelor’s degree and Tennessee employment rates are generally high for graduates.

Educator preparation providers (EPPs) structure academic programs that train teachers in different ways. Most EPPs structure programs around general CIP codes including teaching/education or curriculum and instruction (13.0101 or 13.0301) while preparing graduates to be licensed in specific grade bands (elementary, middle, or high) and/or academic disciplines (math, English, history, etc.). However, EPPs can structure programs more narrowly using specialized CIP codes. For example, 13.1312 Music Teacher Education programs specifically prepare graduates to be Music teachers. While specialized CIPs and programs are options for EPPs, generalized programs are favored to not limit students’ licensure opportunities or the faculty that may teach in the program.

Postsecondary Education and Training Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
13.0401	Educational Leadership and Administration, General.	CPBA	30	73%	\$72,769
13.0401	Educational Leadership and Administration, General.	MA	448	83%	\$66,171
13.0401	Educational Leadership and Administration, General.	EDS	34	76%	\$72,080
13.0401	Educational Leadership and Administration, General.	D	132	80%	\$81,468
13.0406	Higher Education/Higher Education Administration.	CPBA	*	*	*
13.0406	Higher Education/Higher Education Administration.	MA	*	*	*
13.0406	Higher Education/Higher Education Administration.	D	12	42%	\$96,757
13.0411	Superintendency and Educational System Administration.	EDS	*	*	*
13.0499	Educational Administration and Supervision, Other.	CPBA	*	*	*
13.0499	Educational Administration and Supervision, Other.	D	97	45%	\$80,501
13.0603	Educational Statistics and Research Methods.	CPBA	*	*	*
13.1203	Junior High/Intermediate/Middle School Education and Teaching.	BA	77	75%	\$41,538
13.1203	Junior High/Intermediate/Middle School Education and Teaching.	MA	*	*	*
13.1205	Secondary Education and Teaching.	BA	76	82%	\$43,546
13.1205	Secondary Education and Teaching.	MA	38	66%	\$53,907
13.1206	Teacher Education, Multiple Levels.	BA	310	81%	\$43,710
13.1210	Early Childhood Education and Teaching.	BA	94	74%	\$42,724
13.1210	Early Childhood Education and Teaching.	CPBA	*	*	*
13.1210	Early Childhood Education and Teaching.	MA	21	48%	\$46,213
13.1210	Early Childhood Education and Teaching.	D	*	*	*
13.1211	Online Educator/Online Teaching.	CPBA	*	*	*
13.1302	Art Teacher Education.	BA	*	*	*
13.1302	Art Teacher Education.	MA	*	*	*
13.1303	Business and Innovation/Entrepreneurship Teacher Education.	MA	*	*	*
13.1305	English/Language Arts Teacher Education.	BA	18	50%	\$44,100
13.1305	English/Language Arts Teacher Education.	MA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
13.1306	Foreign Language Teacher Education.	MA	*	*	*
13.1307	Health Teacher Education.	BA	*	*	*
13.1310	Sales and Marketing Operations/Marketing and Distribution Teacher Education.	BA	*	*	*
13.1311	Mathematics Teacher Education.	BA	*	*	*
13.1311	Mathematics Teacher Education.	MA	*	*	*
13.1312	Music Teacher Education.	BA	31	45%	\$45,422
13.1312	Music Teacher Education.	MA	*	*	*
13.1314	Physical Education Teaching and Coaching.	BA	31	35%	\$35,691
13.1314	Physical Education Teaching and Coaching.	MA	*	*	*
13.1315	Reading Teacher Education.	MA	38	76%	\$58,211
13.1315	Reading Teacher Education.	D	*	*	*
13.1316	Science Teacher Education/General Science Teacher Education.	BA	*	*	*
13.1322	Biology Teacher Education.	BA	*	*	*
13.1322	Biology Teacher Education.	MA	*	*	*
13.1323	Chemistry Teacher Education.	BA	*	*	*
13.1323	Chemistry Teacher Education.	MA	*	*	*
13.1324	Drama and Dance Teacher Education.	BA	*	*	*
13.1328	History Teacher Education.	BA	*	*	*
13.1328	History Teacher Education.	MA	*	*	*
13.1330	Spanish Language Teacher Education.	BA	*	*	*
13.1330	Spanish Language Teacher Education.	MA	*	*	*
13.1334	School Librarian/School Library Media Specialist.	CPBA	*	*	*
13.1399	Teacher Education and Professional Development, Specific Subject Areas, Other.	CPBA	*	*	*
13.1399	Teacher Education and Professional Development, Specific Subject Areas, Other.	MA	129	78%	\$51,352
13.1399	Teacher Education and Professional Development, Specific Subject Areas, Other.	EDS	*	*	*
13.1401	Teaching English as a Second or Foreign Language/ESL Language Instructor.	BA	*	*	*
13.1401	Teaching English as a Second or Foreign Language/ESL Language Instructor.	CPBA	95	86%	\$66,306
13.1401	Teaching English as a Second or Foreign Language/ESL Language Instructor.	MA	42	57%	\$58,126
13.1502	Adult Literacy Tutor/Instructor.	CPBA	*	*	*
13.9999	Education, Other.	BA	15	13%	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
19.0101	Family and Consumer Sciences/Human Sciences, General.	BA	72	60%	\$30,036
19.0101	Family and Consumer Sciences/Human Sciences, General.	MA	12	67%	\$49,736
19.0401	Family Resource Management Studies, General.	BA	66	64%	\$32,077
19.0402	Consumer Economics.	BA	29	24%	\$36,960
19.0701	Human Development and Family Studies, General.	BA	68	57%	\$34,418
19.0701	Human Development and Family Studies, General.	CPBA	*	*	*
19.0701	Human Development and Family Studies, General.	MA	28	54%	\$50,308
19.0701	Human Development and Family Studies, General.	D	*	*	*
19.0704	Family Systems.	BA	*	*	*
19.0901	Apparel and Textiles, General.	BA	24	67%	\$36,509
25.0101	Library and Information Science.	CPBA	*	*	*
25.0101	Library and Information Science.	MA	173	54%	\$50,180
25.0102	Children and Youth Library Services.	CPBA	*	*	*
50.0912	Music Pedagogy.	C < 1 YR	*	*	*
50.0912	Music Pedagogy.	CPBA	*	*	*

While there were no HS CTE concentrator graduates in 2021-22, CTE enrollments from more recent academic years indicate that will change. In 2022-23, the Education and Training career cluster had 2,000 Tennessee high school concentrators enrolled across three programs: Teaching as a Profession, Early Childhood Education Careers, and Educational Guidance and Social Services. Students enrolled in these pathways can earn the Child Development Associate (CDA) industry credential and participate in work-based learning experiences within the local school system and at childcare facilities. Dyersburg State Community College (DSCC) partners with multiple West Tennessee high schools to offer dual enrollment courses that lead to CDA credentialing.⁵⁷ Students in the Teaching as a Profession program at Macon County High School are applying teaching concepts and skills in real world settings by working alongside mentoring teachers to plan, present, assess, and adapt

⁵⁷ Dyersburg State Community College, Tennessee Early Childhood Training Alliance, <https://www.dsc.edu/tecta/>

instruction with diverse populations throughout the school district. The Educational Guidance and Social Services program is new and was created specifically to address the demand for school counselors. High school programming is evolving to meet the needs of the education and training workforce.

Education and Training Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
13.1206	Teacher Education, Multiple Levels.	28
13.1210	Early Childhood Education and Teaching.	*

Cluster Ten: Protective Services and Law Occupations

The protective services and law career cluster includes occupations focused on providing legal, public safety, and protective services.

Security guards typically work in the investigation and security services industry but can also work directly for colleges and universities and other public institutions. Security guards are represented in the workforce of TNECD's aerospace & defense industry sector. This sector contains companies specializing in the production of aerospace parts and helicopters to handguns and uranium for nuclear weapons, necessitating personnel for onsite security and protection.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
33-3012	Correctional Officers and Jailers		3	\$32,193	High school diploma or equivalent		
33-9032	Security Guards		3	\$23,955	High school diploma or equivalent	*	
43-5031	Public Safety Telecommunicators		1	\$28,863	High school diploma or equivalent		

Protective Services and Law Aligned Academic Programs

Colleges in Tennessee offer several programs beginning at the certificate level to support the needs for correctional officers and security guards. The <1-year certificate program in Police Science graduated over 260 completers in 2021-22 and boasts a nearly 90 percent employment rate in Tennessee with median first-year wages exceeding \$46,000.

Postsecondary Protective Services and Law Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
43.0102	Corrections.	C 1-2 YR	*	*	*
43.0103	Criminal Justice/Law Enforcement Administration.	BA	550	62%	\$36,410

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
43.0103	Criminal Justice/Law Enforcement Administration.	MA	87	60%	\$49,567
43.0104	Criminal Justice/Safety Studies.	AA	96	71%	\$33,458
43.0104	Criminal Justice/Safety Studies.	BA	113	43%	\$48,828
43.0104	Criminal Justice/Safety Studies.	MA	*	*	*
43.0106	Forensic Science and Technology.	CPBA	*	*	*
43.0107	Criminal Justice/Police Science.	C < 1 YR	268	89%	\$46,660
43.0107	Criminal Justice/Police Science.	C 1-2 YR	*	*	*
43.0107	Criminal Justice/Police Science.	AA	17	94%	\$44,777
43.0199	Corrections and Criminal Justice, Other.	C < 1 YR	*	*	*
43.0199	Corrections and Criminal Justice, Other.	AA	*	*	*
43.0406	Forensic Science and Technology.	BA	16	63%	\$34,592
45.0401	Criminology.	BA	15	47%	\$22,234

High School CTE Protective Services and Law Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
43.0102	Corrections.	CTE HS	2,575	52%	\$38,756

Over 2,500 high school CTE concentrators graduated in 2021-22 as part of the Corrections pathway with over half of graduates found in the Tennessee workforce. The Law, Public Safety, Corrections, and Security pathways enrolled 7,500 concentrators across its three programs of study: Criminal Justice, Pre-Law, and Fire Management Services in 2022-23. High school CTE programs offer an important opportunity to expose high school students to an in-demand career. Heritage High School in Blount County offers the Criminal Justice and Correction Services pathway which educates students on the standards and practices of police, courts, and corrections with knowledge and practical application.

Cluster Eleven: Arts and Communication Occupations

Tennessee’s music and arts pedigree is unparalleled. Tennessee is the birthplace of country music and rock ‘n’ roll, the home of the blues, and the starting point of soul. Throughout the state, museums showcase stunning works in every medium and from many cultures. World-renowned attractions in Tennessee include Elvis Presley’s Graceland, Sun Studio, Memphis Rock ‘n’ Soul Museum, Stax Museum of American Soul Music, Grand Ole Opry, Ryman Auditorium, Country Music Hall of Fame and Museum, Schermerhorn Symphony Center, Brooks Museum of Art, Cheekwood Botanical Gardens and Museum of Art, Frist Center for the Visual Arts, The Parthenon, Hunter Museum of Art, Knoxville Museum of Art, and the International Storytelling Center. The National Museum of African American Music in Nashville is among the latest museums to add to this list.

Nationally, it is expected that workers will be needed to meet demand for animation and visual effects in video games, movies, television, and on smartphones. In addition, arts and design workers are expected to create visually appealing and effective layouts of websites and other media platforms.

Graphic designers are in-demand in four regions in Tennessee. Employers seek candidates with skills in Adobe Creative Cloud software (including Illustrator, Photoshop, and InDesign), Microsoft Office, HTML, and JavaScript. Graphic designers are employed across many different industries, including printing and related support activities; specialized design services; advertising, public relations, and related services; management, scientific, and technical consulting services; and converted paper product manufacturing.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
25-1121	Art, Drama, and Music Teachers, Postsecondary		1	\$43,067	Master's degree		
27-1011	Art Directors		1	\$49,809	Bachelor's degree		
27-1024	Graphic Designers		4	\$33,811	Bachelor's degree	*	
27-2012	Producers and Directors	X	1	\$34,885	Bachelor's degree		
27-2041	Music Directors and Composers		1	\$28,797	Bachelor's degree		
27-3041	Editors	X	3	\$35,259	Bachelor's degree		
27-4011	Audio and Video Technicians		1	\$31,202	Postsecondary nondegree award		
51-5112	Printing Press Operators		5	\$28,846	High school diploma or equivalent		

Arts and Communication Aligned Academic Programs

As the music capitol of the world, Tennessee’s institutions offer students a variety of ways to pursue the dream of joining in Tennessee’s rich artistic heritage.

Middle Tennessee State University offers an audio production baccalaureate degree that offers hands-on experience in state-of-the-art facilities for those who want to create today’s hits. Other programs offering practical experiences include Bethel’s theories of musicology and University of Tennessee, Knoxville’s master’s degree in composition.

Multiple programs exist to teach students about music and how to support musical talents in others. East Tennessee State University offers a bachelor’s degree in Bluegrass, Old-Time, and Roots Music exploring the history of the region’s sound and the University of Memphis has a master’s degree in musical pedagogy from the University of Memphis.

Programs within the Arts and Communications cluster range from the certificate to doctoral level. Beyond music, programs in the cluster offer training in public relations, fine arts, journalism, mass media communications, and more.

Postsecondary Arts and Communication Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
09.0100	Communication, General.	BA	185	62%	\$33,637
09.0100	Communication, General.	MA	*	*	*
09.0101	Speech Communication and Rhetoric.	BA	210	50%	\$38,277
09.0102	Mass Communication/Media Studies.	AA	*	*	*
09.0102	Mass Communication/Media Studies.	BA	223	62%	\$30,633
09.0102	Mass Communication/Media Studies.	MA	110	62%	\$48,209
09.0102	Mass Communication/Media Studies.	D	15	33%	\$50,000
09.0199	Communication and Media Studies, Other.	BA	14	71%	\$43,012
09.0401	Journalism.	BA	210	63%	\$34,679
09.0401	Journalism.	MA	17	47%	\$47,919
09.0402	Broadcast Journalism.	BA	*	*	*
09.0499	Journalism, Other.	BA	*	*	*
09.0701	Radio and Television.	BA	*	*	*
09.0702	Digital Communication and Media/Multimedia.	BA	25	52%	\$27,688
09.0906	Sports Communication.	BA	*	*	*
09.9999	Communication, Journalism, and Related Programs, Other.	BA	29	69%	\$32,353
10.0105	Communications Technology/Technician.	AA	80	61%	\$26,804

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
10.0203	Recording Arts Technology/Technician.	C < 1 YR	*	*	*
10.0203	Recording Arts Technology/Technician.	C 1-2 YR	*	*	*
10.0203	Recording Arts Technology/Technician.	AA	10	50%	\$22,896
10.0203	Recording Arts Technology/Technician.	BA	*	*	*
10.0203	Recording Arts Technology/Technician.	MA	*	*	*
13.0501	Educational/Instructional Technology.	CPBA	17	71%	\$56,743
13.0501	Educational/Instructional Technology.	MA	32	41%	\$56,773
23.1302	Creative Writing.	BA	18	44%	\$19,736
23.1303	Professional, Technical, Business, and Scientific Writing.	BA	*	*	*
23.1304	Rhetoric and Composition.	BA	17	41%	\$22,462
30.1401	Museology/Museum Studies.	BA	*	*	*
30.1401	Museology/Museum Studies.	CPBA	*	*	*
39.0501	Religious/Sacred Music.	BA	11	0%	*
50.0101	Visual and Performing Arts, General.	AA	*	*	*
50.0101	Visual and Performing Arts, General.	BA	19	63%	\$28,905
50.0102	Digital Arts.	AA	28	64%	\$24,349
50.0102	Digital Arts.	BA	24	33%	\$30,335
50.0401	Design and Visual Communications, General.	BA	*	*	*
50.0402	Commercial and Advertising Art.	C < 1 YR	16	44%	\$19,993
50.0402	Commercial and Advertising Art.	C 1-2 YR	51	55%	\$21,664
50.0402	Commercial and Advertising Art.	AA	58	53%	\$32,804
50.0409	Graphic Design.	BA	43	56%	\$34,136
50.0501	Drama and Dramatics/Theatre Arts, General.	BA	102	55%	\$22,658
50.0501	Drama and Dramatics/Theatre Arts, General.	MA	10	20%	*
50.0506	Acting.	C < 1 YR	11	64%	\$17,781
50.0506	Acting.	BA	*	*	*
50.0507	Directing and Theatrical Production.	BA	*	*	*
50.0509	Musical Theatre.	BA	*	*	*
50.0599	Dramatic/Theatre Arts and Stagecraft, Other.	BA	*	*	*
50.0601	Film/Cinema/Media Studies.	BA	15	47%	\$11,579
50.0602	Cinematography and Film/Video Production.	C < 1 YR	*	*	*
50.0602	Cinematography and Film/Video Production.	BA	88	56%	\$25,739
50.0602	Cinematography and Film/Video Production.	CPBA	*	*	*
50.0602	Cinematography and Film/Video Production.	MA	*	*	*
50.0701	Art/Art Studies, General.	BA	251	61%	\$28,362
50.0701	Art/Art Studies, General.	MA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
50.0702	Fine/Studio Arts, General.	BA	94	51%	\$21,334
50.0702	Fine/Studio Arts, General.	MA	*	*	*
50.0703	Art History, Criticism and Conservation.	BA	13	23%	*
50.0703	Art History, Criticism and Conservation.	MA	*	*	*
50.0708	Painting.	BA	*	*	*
50.0901	Music, General.	AA	*	*	*
50.0901	Music, General.	BA	212	52%	\$35,666
50.0901	Music, General.	CPBA	*	*	*
50.0901	Music, General.	MA	69	42%	\$39,174
50.0901	Music, General.	D	*	*	*
50.0903	Music Performance, General.	AA	40	73%	\$19,208
50.0903	Music Performance, General.	BA	13	8%	*
50.0903	Music Performance, General.	MA	*	*	*
50.0904	Music Theory and Composition.	BA	*	*	*
50.0905	Musicology and Ethnomusicology.	BA	*	*	*
50.0913	Music Technology.	BA	79	53%	\$32,963
50.0999	Music, Other.	C 1-2 YR	*	*	*
50.0999	Music, Other.	BA	39	26%	\$25,255

High School CTE Arts and Communications Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
09.0702	Digital Communication and Media/Multimedia.	CTE HS	1,290	51%	\$41,537
10.0299	Audiovisual Communications Technologies/Tech., Other	CTE HS	960	52%	\$36,632

Over 2,000 high school graduates in 2021-22 concentrated in the Arts and Communications cluster with over half found employed in Tennessee. The Arts, A/V Technology, and Communications career cluster has 5,800 Tennessee high school concentrators enrolled in Digital Arts and Design, Audio/Visual Production and Fashion Design programs of study in 2022-23. Students enrolled in these courses can earn industry credentials in multiple Adobe platforms. Elizabethton High School offers students work-based learning experiences within the school to create pictures, graphics, live streams of events, promotional videos, and design work for the school system.

Cluster Twelve: Leisure and Recreation Occupations

Tennessee is well-known for its great outdoors. According to the U.S. National Park Service, there are 13 national parks in Tennessee.⁵⁸ The Great Smoky Mountains National Park, received over 12.9 million visitors in 2022,⁵⁹ making it the most visited national park in the country.⁶⁰ There are also 57 state parks⁶¹ and 84 natural areas⁶² across Tennessee.

In the last five years, Tennessee’s Leisure and Hospitality private sector employment has increased by 6.7 percent.⁶³ Most of the in-demand occupations in the leisure and recreation career cluster require only a high school diploma or equivalent. Food service managers, lodging managers, meeting, convention, and event planners, chefs and head cooks, supervisors of food-preparation and serving workers, supervisors of housekeeping and janitorial workers, pest control workers, and exercise trainers and group fitness workers are all in-demand in statewide and, for some of these, in nearly all regions in the state.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-9051	Food Service Managers	X	9	\$34,011	High school diploma or equivalent		
11-9081	Lodging Managers	X	5	\$27,107	High school diploma or equivalent		
13-1121	Meeting, Convention, and Event Planners	X	3	\$31,431	Bachelor's degree		
27-2022	Coaches and Scouts	X	7	\$23,088	Bachelor's degree		
35-1011	Chefs and Head Cooks	X	7	\$38,123	High school diploma or equivalent		

⁵⁸ National Park Service – [Tennessee](#)

⁵⁹ [National Park Services, Annual Park Recreation Visits Stats Report Viewer](#)

⁶⁰ USA Today, [America's most-visited national parks](#)

⁶¹ Tennessee State Parks, [Find a Park](#)

⁶² Tennessee Department of Environment & Conservation, [List of Natural Areas](#)

⁶³ U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages, Leisure and Hospitality, June 2018 – June 2023

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
35-1012	First-Line Supervisors of Food Preparation and Serving Workers	X	7	\$26,522	High school diploma or equivalent		
37-1011	First-Line Supervisors of Housekeeping and Janitorial Workers	X	9	\$29,997	High school diploma or equivalent		
37-2021	Pest Control Workers	X	9	\$28,807	High school diploma or equivalent		
39-1014	First-Line Supervisors of Entertainment and Recreation Workers, Except Gambling Services		2	\$24,851	High school diploma or equivalent		
39-7010	Tour and Travel Guides		2	\$22,511	High school diploma or equivalent		
39-9031	Exercise Trainers and Group Fitness Instructors	X	9	\$24,048	High school diploma or equivalent		
43-4181	Reservation and Transportation Ticket Agents and Travel Clerks		1	\$27,834	High school diploma or equivalent		
51-3011	Bakers		2	\$23,867	No formal educational credential	*	

Leisure and Recreation Aligned Academic Programs

Postsecondary Leisure and Recreation Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
12.0500	Cooking and Related Culinary Arts, General.	C < 1 YR	*	*	*
12.0503	Culinary Arts/Chef Training.	C 1-2 YR	28	71%	\$33,304
12.0503	Culinary Arts/Chef Training.	AA	19	63%	\$33,916
31.0101	Parks, Recreation, and Leisure Studies.	BA	*	*	*
31.0301	Parks, Recreation, and Leisure Facilities Management, General.	BA	29	79%	\$27,444
31.0501	Sports, Kinesiology, and Physical Education/Fitness, General.	BA	402	59%	\$31,185
31.0501	Sports, Kinesiology, and Physical Education/Fitness, General.	MA	55	55%	\$47,901
31.0501	Sports, Kinesiology, and Physical Education/Fitness, General.	D	*	*	*
31.0504	Sport and Fitness Administration/Management.	BA	237	47%	\$32,513
31.0504	Sport and Fitness Administration/Management.	CPBA	10	20%	*
31.0504	Sport and Fitness Administration/Management.	MA	83	36%	\$44,461
31.0505	Exercise Science and Kinesiology.	BA	942	60%	\$30,703
31.0507	Physical Fitness Technician.	BA	*	*	*
31.0508	Sports Studies.	BA	*	*	*
31.0508	Sports Studies.	MA	*	*	*
31.0599	Sports, Kinesiology, and Physical Education/Fitness, Other.	BA	*	*	*
31.9999	Parks, Recreation, Leisure, Fitness, and Kinesiology, Other.	BA	*	*	*
52.0901	Hospitality Administration/Management, General.	BA	64	55%	\$39,280
52.0901	Hospitality Administration/Management, General.	D	*	*	*
52.0904	Hotel/Motel Administration/Management.	C < 1 YR	*	*	*
52.0904	Hotel/Motel Administration/Management.	C 1-2 YR	*	*	*
52.0904	Hotel/Motel Administration/Management.	AA	34	74%	\$29,806
52.0904	Hotel/Motel Administration/Management.	BA	12	58%	\$32,591
52.0905	Restaurant/Food Services Management.	C < 1 YR	*	*	*

While most in-demand occupations in the Leisure and Recreation cluster require a high school diploma only, there are postsecondary programs offered that place students in desirable careers. Academic programs in this cluster fuel the industry that annually welcomes millions of tourists and Tennesseans as they experience the sights, sounds, and adventures that the state offers.

The hotel/motel administration programs are small but do place a large share of their graduates in Tennessee. Wages are lower than the state median for graduates of these programs which may be a challenge for recruitment.

Post-baccalaureate programs in sports, kinesiology and fitness boast the highest wages for postsecondary graduates in this cluster. Middle Tennessee State University offers a Leisure and Sport Management program which is the only program of its kind at Tennessee’s public institutions, where students have experiential learning opportunities that prepare them for work after the classroom.

High School CTE Leisure and Recreation Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
12.0503	Culinary Arts/Chef Training.	CTE HS	1,915	51%	\$38,235
31.0507	Physical Fitness Technician.	CTE HS	1,573	51%	\$38,160
52.0901	Hospitality Administration/Management, General.	CTE HS	144	39%	\$39,459

High school CTE concentrator graduates in the Leisure and Recreation cluster were sizeable in 2021-22. Nearly 2,000 graduates completed a culinary arts program of study and just over half were found in Tennessee’s job market. Another 1,500 graduates completed concentrations in fitness. In 2022-23, the Hospitality and Tourism career cluster had 5,500 concentrators enrolled in its Culinary Arts and Hospitality and Tourism Management career clusters. Students participating in this cluster can earn multiple ServSafe industry credentials and participate in on-site culinary businesses. The Taste of Liberty is a student-run restaurant opened in fall 2023 at Liberty Technology High School through the Jackson-Madison County School District.⁶⁴

⁶⁴ Liberty Technology High School, Taste of Liberty (Culinary Arts), <https://www.jmcsc.org/domain/1124>

Leisure and Recreation Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
12.0502	Bartending/Bartender.	*
12.0503	Culinary Arts/Chef Training.	*

Cluster Thirteen: Information Technology Occupations

Computer and information technology occupations typically have comparatively high wages in Tennessee compared to most other occupations. Information Technology (IT) based occupations - including computer network architects, software developers and database administrators - earn a median wage of \$78,000, almost double the median wage for all occupations in TN. These occupations usually require a bachelor's degree and specialized skills, depending on the field.⁶⁵

As a result of the COVID-19 pandemic, the workplace has changed. Many workers enjoy remote work and seek out work-from-home opportunities. The availability of broadband, especially in rural areas of the state, is key to connecting workers to remote work job opportunities. For this continued expansion, there will be a need for IT infrastructure support and security. Occupations, like information security analysts and computer user support specialists, are crucial for companies with ever growing technological needs. This situation offers a great opportunity for Tennesseans to fulfill the global workforce shortage remotely.

Multiple IT occupations pay high wages and require important technical and soft skills for success. Information security analysts (cybersecurity) ensure appropriate security controls are in place to safeguard files and infrastructure from accidental or unauthorized modification, destruction, or disclosure. This fast-growing occupation has a median annual wage of \$95,000 in Tennessee.⁶⁶ Online job postings for Cybersecurity are seeking candidates with skills in computer science, network and system security, and customer service. Computer user support specialists provide technical assistance to users about software or hardware operation to resolve problems. Job skills necessary for this position include customer service, problem solving, and conflict management. These occupations are great for entry level experience and can lead to exciting careers in IT. Finally, Data Science occupations yield earnings at \$94,000, which is the highest median earnings of any other information technology occupation.⁶⁷ This occupation requires skills in data analytics, statistical modeling, data mining, cleaning, and warehousing.

Tennessee has a strong and growing Headquarters, Finance & Tech⁶⁸ sector that frequently employs IT professionals. Tennessee also has unique research and development (R&D)

⁶⁵ TNECD analysis of employment data from U.S. Bureau of Labor Statistics, Jobs4tn – Employment and Wage Statistics [Jobs4tn OEWS](#), LMI

⁶⁶ TNECD analysis of employment data from U.S. Bureau of Labor Statistics, Jobs4tn – Occupation Profile Information Security Analysts, LMI

⁶⁷ TNECD analysis of employment data from U.S. Bureau of Labor Statistics, Jobs4tn – Occupation profile, Data Scientists, LMI

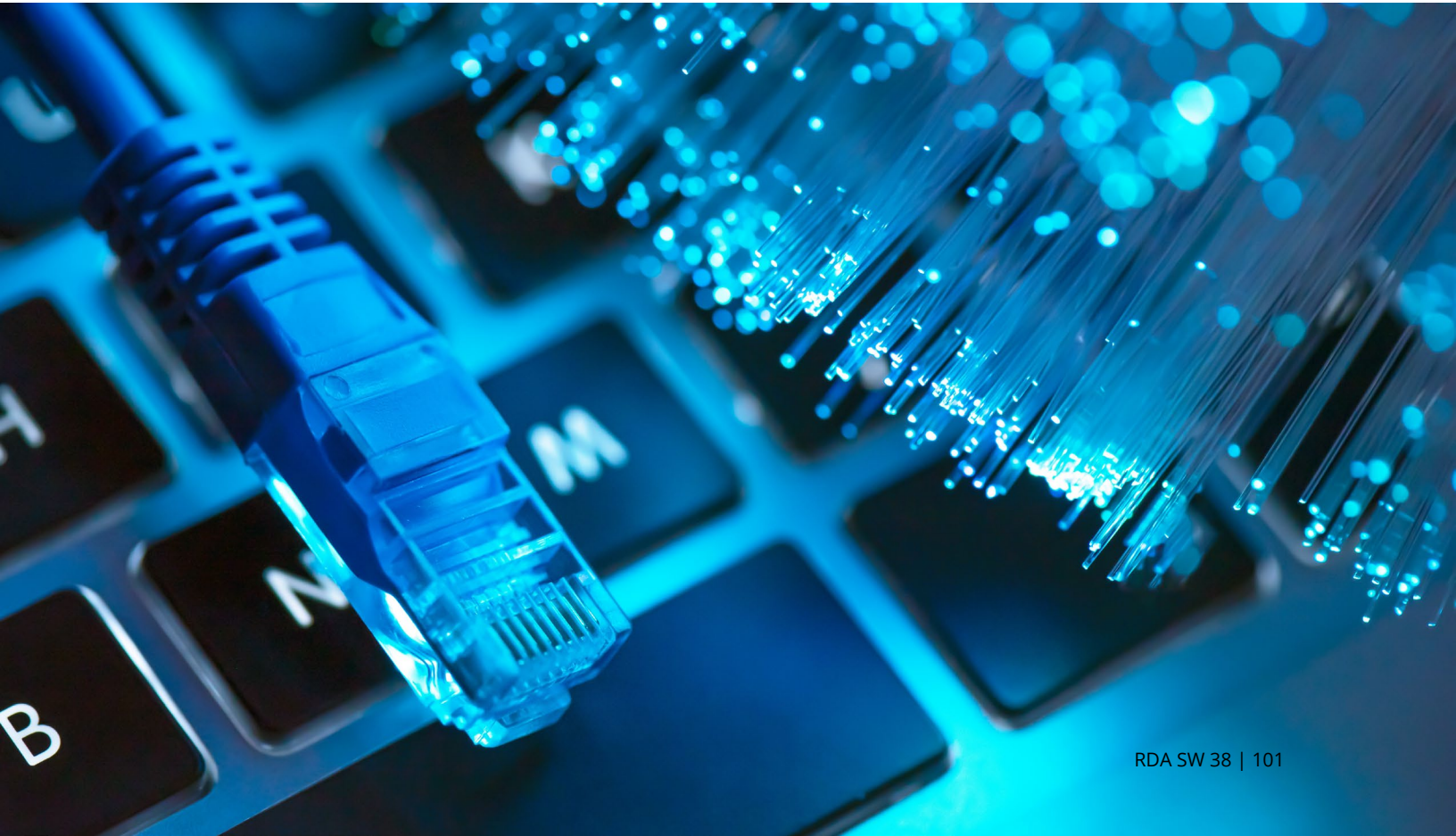
⁶⁸ TNECD, [HQ, Finance and Tech](#)

Tennessee Broadband Accessibility Grant

Broadband availability reduces workforce gaps by providing opportunities for student learning and training and by connecting jobseekers with potential employers. The goal of the Tennessee Department of Economic and Community Development's (TNECD) broadband accessibility grant is to facilitate broadband access to all Tennesseans while promoting practices that increase deployment and encourage adoption.

The broadband accessibility grant program is designed to offset capital expenses in the deployment of broadband in unserved areas. Funds are targeted to areas that are unlikely to receive broadband service without grant funding. To date, broadband infrastructure programs have awarded grants to serve over **449,695** Tennesseans. TNECD has also used federal funding to further close the digital divide through digital opportunity projects.

In 2024, \$50M of digital opportunity projects will be announced to encourage adoption, digital skills training, workforce development programs, and outreach to underserved populations. Additional federal funding through the Infrastructure Investment and Jobs Act will provide further resources for infrastructure and digital opportunity programs over the next 5-10 years.



assets and facilities, including St. Jude Children’s Research Hospital, Vanderbilt University, Oak Ridge National Laboratory (ORNL), U.S. Airforce Arnold Engineering Development Complex, and the University of Tennessee. These organizations provide world-changing technologies to businesses R&D assets and facilities frequently employ information technology occupations. The co-existence of Headquarters, Finance, and Tech industries, R&D, and education drives the need for IT professionals in our state.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry Sectors	STEM
		TN	Total # Regions				
11-3021	Computer and Information Systems Managers		1	\$87,828	Bachelor's degree	*	#
15-1211	Computer Systems Analysts	X	4	\$59,031	Bachelor's degree	*	#
15-1212	Information Security Analysts	X	5	\$68,001	Bachelor's degree	*	#
15-1231	Computer Network Support Specialists		5	\$42,299	Associate degree	*	#
15-1232	Computer User Support Specialists	X	9	\$36,615	Some college, no degree	*	#
15-1241	Computer Network Architects		1	\$75,483	Bachelor's degree	*	#
15-1244	Network and Computer Systems Administrators		2	\$53,125	Bachelor's degree	*	#
15-1252	Software Developers	X	5	\$64,372	Bachelor's degree	*	#
15-1253	Software Quality Assurance Analysts and Testers		1	\$55,735	Bachelor's degree	*	#
15-1254	Web Developers		1	\$39,652	Bachelor's degree	*	#
15-1299	Computer Occupations, All Other		1	\$38,872	Bachelor's degree	*	#

Information Technology Aligned Academic Programs

Postsecondary Information Technology Degrees, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
11.0101	Computer and Information Sciences, General.	BA	95	60%	\$60,835
11.0101	Computer and Information Sciences, General.	MA	70	24%	\$70,108
11.0103	Information Technology.	C < 1 YR	50	74%	\$39,889
11.0103	Information Technology.	C 1-2 YR	14	93%	\$30,419
11.0103	Information Technology.	AA	326	70%	\$45,107
11.0103	Information Technology.	BA	73	40%	\$48,485
11.0103	Information Technology.	MA	145	49%	\$78,000
11.0104	Informatics.	BA	*	*	*
11.0104	Informatics.	MA	*	*	*
11.0401	Information Science/Studies.	BA	12	75%	\$49,899
11.0501	Computer Systems Analysis/Analyst.	BA	36	67%	\$41,104
11.0701	Computer Science.	BA	481	57%	\$60,000
11.0701	Computer Science.	CPBA	*	*	*
11.0701	Computer Science.	MA	109	45%	\$89,633
11.0701	Computer Science.	D	*	*	*
11.0802	Data Modeling/Warehousing and Database Administration.	BA	*	*	*
11.0802	Data Modeling/Warehousing and Database Administration.	CPBA	*	*	*
11.0802	Data Modeling/Warehousing and Database Administration.	MA	36	56%	\$74,828
11.0804	Modeling, Virtual Environments and Simulation.	BA	*	*	*
11.0901	Computer Systems Networking and Telecommunications.	C < 1 YR	21	86%	\$39,964
11.0901	Computer Systems Networking and Telecommunications.	C 1-2 YR	21	71%	\$38,845
11.1002	System, Networking, and LAN/WAN Management/Manager.	C < 1 YR	11	91%	\$39,975
11.1002	System, Networking, and LAN/WAN Management/Manager.	C 1-2 YR	22	95%	\$48,000
11.1003	Computer and Information Systems Security/Auditing/Information Assurance.	C < 1 YR	12	67%	\$56,596
11.1003	Computer and Information Systems Security/Auditing/Information Assurance.	BA	*	*	*
11.1005	Information Technology Project Management.	CPBA	30	33%	\$75,922

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
11.1006	Computer Support Specialist.	C < 1 YR	112	54%	\$26,586
11.1006	Computer Support Specialist.	C 1-2 YR	115	65%	\$32,900
11.9999	Computer and Information Sciences and Support Services, Other.	MA	*	*	*
14.0903	Computer Software Engineering.	BA	11	27%	*
14.0903	Computer Software Engineering.	MA	*	*	*
51.2706	Medical Informatics.	AA	*	*	*
51.2706	Medical Informatics.	BA	*	*	*
51.2706	Medical Informatics.	CPBA	24	63%	\$59,992
51.2706	Medical Informatics.	MA	10	50%	\$57,005
52.1201	Management Information Systems, General.	BA	137	66%	\$49,778

The ever-changing IT field requires academic programs to be nimble as they work to be at the cutting edge of today's technologies. Institutions from across the state offer credentials at several different levels to meet the need for qualified IT specialists that are the underpinning of an increasingly digital economy. Several short-term certificate programs are available across Tennessee's community colleges yielding high wages and high Tennessee employment rates. Academic programs such as the newly approved master's degree in business cybersecurity at the University of Tennessee, Knoxville strive to create flexibility for students. This program and others are offered completely online to meet the needs of today's Tennessee students.

High School CTE Information Technology Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
11.0201	Computer Programming/Programmer, General	CTE HS	1,141	50%	\$38,341
11.1002	System, Networking, and LAN/WAN Management/Manager.	CTE HS	338	55%	\$37,902
11.1003	Computer and Information Systems Security/Auditing/Information Assurance.	CTE HS	290	54%	\$35,044

High schools are increasingly offering students the opportunity to explore IT professions and earn credentials to prepare them for in-demand occupations. Over 1,100 high school graduates in 2021-22 concentrated in the Computer Programming program of study. The Information Technology cluster had 4,500 students enrolled in Coding, Cybersecurity, Web

Design, and Networking Systems programs in 2022-23. Students can earn multiple industry credentials in the CIW and CompTIA catalog, as well as JavaScript and ISC2. In addition to these pathway opportunities, Computer Science is being introduced as a graduation requirement beginning with the freshmen in the 2024-25 school year.

Information Technology Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
11.0201	Computer Programming/Programmer, General.	*

Governor's Investment in Vocational Education (GIVE) Pellissippi State

The Governor's Investment in Vocational Education (GIVE) program aims to create long-term partnerships between Tennessee Colleges of Applied Technology (TCATs), community colleges, industries, economic development/workforce agencies, and K-12 schools. Its main goal is to identify and address the "skills gaps" present in the local workforce. GIVE is a competitive grant that awards of up to \$1 million to local higher education entities to facilitate collaboration between K12, higher education, and workforce partners.

Pellissippi State Community College (PSCC) launched the Information Technology College to Career Collaborative (ITC3), funded by GIVE 2.0. This initiative expands Information Technology (IT) career pathways using a stackable credentials approach. This includes the expansion of IT-related course crosswalks and articulation agreements and the development of IT 4+1 plans with partner high schools. To ensure that students have access to in-demand, industry-recognized certification testing, such as CompTIA A+, Network+, Security+, and others, a collaborative and structured work-based learning (WBL) continuum has been implemented. This continuum starts in middle school and continues through the completion of postsecondary credentials, linking high school and postsecondary programming for students. The ITC3 initiative aims to provide students with a comprehensive and meaningful IT education that prepares them for successful careers.

Cluster Fourteen: Engineering and Other STEM Occupations

Engineering and engineering-related occupations play an instrumental role for Tennessee businesses. These positions provide critical functions in the design, building, and testing of products and equipment. Engineers and related positions are needed across TNECD's target industries, including automotive, aerospace and defense, chemical products, and electrical equipment and appliances. In 2022, approximately 39,000 engineers were employed in Tennessee, with a median wage of about \$93,000. The highest earning engineering occupations make \$110,000 per year or more.⁶⁹

Governor Bill Lee, in the 2023 State of the State, said, "No other state in the country comes close to Tennessee's legacy, resources and potential to be a leader in nuclear energy." He proposed \$50 million in a Nuclear Fast Track fund to recruit companies to our state that will establish a nuclear development and manufacturing ecosystem. Tennessee is the fifth in the nation for nuclear engineering jobs, at 630 jobs.⁷⁰ Tennessee's strong nuclear engineering foundation will support further growth in nuclear energy in the state.

The Arnold Engineering Development Complex (AEDC), an Air Force military facility in Tullahoma, is a major engineering asset to the state. It operates more than 68 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, environmental chambers, arc heaters, ballistic ranges, sled tracks, centrifuges, and other specialized units.

In Tennessee, electrical and electronic engineering technologists and technicians are in-demand in nine regions and electrical engineers in six regions. The technologists and technicians require associate degrees, while the engineers require a bachelor's degree.

⁶⁹TNECD analysis of employment data from U.S. Bureau of Labor Statistics, Jobs4TN, OEWS.

⁷⁰TNECD analysis of employment data from U.S. [Bureau of Labor Statistics](#), OEWS.

SOC Code	Occupation	In-Demand		Statewide Entry-Level Wage	Typical Entry-Level Education	Key to TNECD Industry	STEM
		TN	Total # Regions				
17-2011	Aerospace Engineers		1	\$73,216	Bachelor's degree	*	#
17-2051	Civil Engineers		3	\$63,044	Bachelor's degree	*	#
17-2071	Electrical Engineers		6	\$69,108	Bachelor's degree	*	#
17-2072	Electronics Engineers, Except Computer		2	\$73,513	Bachelor's degree	*	#
17-2081	Environmental Engineers		1	\$67,372	Bachelor's degree	*	#
17-2112	Industrial Engineers		5	\$64,622	Bachelor's degree	*	#
17-2141	Mechanical Engineers	X	5	\$63,696	Bachelor's degree	*	#
17-2199	Engineers, All Other		3	\$60,599	Bachelor's degree	*	#
17-3011	Architectural and Civil Drafters	X	5	\$42,907	Associate degree	*	#
17-3013	Mechanical Drafters		1	\$37,096	Associate degree	*	#
17-3023	Electrical and Electronic Engineering Technologists and Technicians	X	9	\$42,313	Associate degree	*	#
17-3026	Industrial Engineering Technologists and Technicians		4	\$37,458	Associate degree	*	#
19-1021	Biochemists and Biophysicists		1	\$67,327	Doctoral or professional degree	*	#
19-2012	Physicists		1	\$66,038	Doctoral or professional degree	*	#
19-2031	Chemists		2	\$44,305	Bachelor's degree	*	#

Engineering and Other STEM Aligned Academic Programs

Postsecondary Degrees in Engineering and Other STEM, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
14.0101	Engineering, General.	BA	20	60%	\$62,098
14.0101	Engineering, General.	MA	21	33%	\$64,255
14.0101	Engineering, General.	D	38	16%	\$87,753
14.0201	Aerospace, Aeronautical, and Astronautical/Space Engineering, General.	BA	42	26%	\$39,033
14.0201	Aerospace, Aeronautical, and Astronautical/Space Engineering, General.	MA	12	17%	*
14.0201	Aerospace, Aeronautical, and Astronautical/Space Engineering, General.	D	*	*	*
14.0401	Architectural Engineering.	BA	12	50%	\$57,109
14.0801	Civil Engineering, General.	BA	174	70%	\$66,327
14.0801	Civil Engineering, General.	MA	43	56%	\$71,053
14.0801	Civil Engineering, General.	D	11	55%	\$55,606
14.0901	Computer Engineering, General.	BA	50	54%	\$68,000
14.0901	Computer Engineering, General.	MA	*	*	*
14.0901	Computer Engineering, General.	D	*	*	*
14.1001	Electrical and Electronics Engineering.	BA	198	54%	\$75,680
14.1001	Electrical and Electronics Engineering.	MA	35	37%	\$89,788
14.1001	Electrical and Electronics Engineering.	D	20	5%	*
14.1201	Engineering Physics/Applied Physics.	BA	*	*	*
14.1201	Engineering Physics/Applied Physics.	D	*	*	*
14.1301	Engineering Science.	BA	*	*	*
14.1301	Engineering Science.	D	*	*	*
14.1401	Environmental/Environmental Health Engineering.	MA	*	*	*
14.1901	Mechanical Engineering.	BA	444	57%	\$70,069
14.1901	Mechanical Engineering.	MA	43	37%	\$81,180
14.1901	Mechanical Engineering.	D	12	33%	*
14.3501	Industrial Engineering.	BA	41	37%	\$70,818
14.3501	Industrial Engineering.	MA	29	66%	\$106,816
14.3501	Industrial Engineering.	D	*	*	*
14.4201	Mechatronics, Robotics, and Automation Engineering.	BA	62	71%	\$70,470
14.9999	Engineering, Other.	CPBA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
14.9999	Engineering, Other.	MA	*	*	*
14.9999	Engineering, Other.	D	16	31%	\$108,241
15.0000	Engineering Technologies/Technicians, General.	C < 1 YR	57	88%	\$73,223
15.0000	Engineering Technologies/Technicians, General.	AA	115	80%	\$50,188
15.0000	Engineering Technologies/Technicians, General.	BA	211	70%	\$59,070
15.0000	Engineering Technologies/Technicians, General.	CPBA	*	*	*
15.0000	Engineering Technologies/Technicians, General.	MA	*	*	*
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician.	C < 1 YR	26	73%	\$50,940
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician.	AA	85	79%	\$53,365
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician.	BA	12	75%	\$43,210
15.0305	Telecommunications Technology/Technician.	C 1-2 YR	*	*	*
15.0406	Automation Engineer Technology/Technician.	C < 1 YR	13	92%	\$59,615
15.0406	Automation Engineer Technology/Technician.	C 1-2 YR	*	*	*
15.0612	Industrial Technology/Technician.	C < 1 YR	*	*	*
15.0612	Industrial Technology/Technician.	AA	51	73%	\$39,533
15.0612	Industrial Technology/Technician.	MA	12	33%	*
15.0613	Manufacturing Engineering Technology/Technician.	C < 1 YR	18	83%	\$69,004
15.0613	Manufacturing Engineering Technology/Technician.	C 1-2 YR	25	80%	\$52,038
15.0613	Manufacturing Engineering Technology/Technician.	AA	*	*	*
15.0614	Welding Engineering Technology/Technician.	C < 1 YR	*	*	*
15.0614	Welding Engineering Technology/Technician.	AA	*	*	*
15.0615	Chemical Engineering Technology/Technician.	C < 1 YR	*	*	*
15.0615	Chemical Engineering Technology/Technician.	C 1-2 YR	*	*	*
15.0615	Chemical Engineering Technology/Technician.	AA	20	80%	\$59,021
15.0801	Aeronautical/Aerospace Engineering Technology/Technician.	BA	13	62%	\$60,492
15.1201	Computer Engineering Technology/Technician.	AA	*	*	*
15.1301	Drafting and Design Technology/Technician, General.	C < 1 YR	33	76%	\$34,441
15.1301	Drafting and Design Technology/Technician, General.	C 1-2 YR	50	66%	\$41,138
15.1303	Architectural Drafting and Architectural CAD/CADD.	C < 1 YR	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD.	C < 1 YR	*	*	*
15.1306	Mechanical Drafting and Mechanical Drafting CAD/CADD.	C 1-2 YR	*	*	*
26.0101	Biology/Biological Sciences, General.	MA	40	45%	\$47,776
26.0101	Biology/Biological Sciences, General.	D	17	35%	\$46,095
26.0102	Biomedical Sciences, General.	BA	10	40%	*
26.0102	Biomedical Sciences, General.	MA	*	*	*
26.0102	Biomedical Sciences, General.	D	23	30%	\$55,378
26.0202	Biochemistry.	MA	*	*	*
26.0202	Biochemistry.	D	*	*	*
26.0203	Biophysics.	BA	*	*	*
26.0204	Molecular Biology.	MA	31	42%	\$50,275
26.0204	Molecular Biology.	D	*	*	*
26.0503	Medical Microbiology and Bacteriology.	MA	*	*	*
26.0503	Medical Microbiology and Bacteriology.	D	*	*	*
26.1001	Pharmacology.	MA	*	*	*
26.1101	Biometry/Biometrics.	CPBA	*	*	*
26.1102	Biostatistics.	CPBA	*	*	*
26.1102	Biostatistics.	D	*	*	*
26.1199	Biomathematics, Bioinformatics, and Computational Biology, Other.	CPBA	*	*	*
26.1301	Ecology.	MA	*	*	*
26.1301	Ecology.	D	11	27%	*
26.1309	Epidemiology.	CPBA	*	*	*
26.1309	Epidemiology.	MA	*	*	*
26.1309	Epidemiology.	D	*	*	*
26.9999	Biological and Biomedical Sciences, Other.	MA	52	63%	\$55,381
26.9999	Biological and Biomedical Sciences, Other.	D	10	50%	\$49,220
30.0101	Biological and Physical Sciences.	BA	39	54%	\$26,041
30.0601	Systems Science and Theory.	D	*	*	*
30.1501	Science, Technology and Society.	MA	*	*	*
30.1701	Behavioral Sciences.	BA	*	*	*
30.2501	Cognitive Science, General.	CPBA	*	*	*
40.0501	Chemistry, General.	BA	194	48%	\$39,804
40.0501	Chemistry, General.	MA	19	32%	\$56,473
40.0501	Chemistry, General.	D	28	25%	\$59,000
40.0599	Chemistry, Other.	BA	*	*	*

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
40.0801	Physics, General.	MA	22	9%	*
40.0801	Physics, General.	D	20	15%	*
51.2010	Pharmaceutical Sciences.	MA	*	*	*
51.2010	Pharmaceutical Sciences.	D	*	*	*

Academic programs at Tennessee’s higher education institutions are equipping students with the skills needed for the in-demand occupations of the Engineering and Other STEM cluster. This cluster represents some of the highest growth fields in the state and around the country.

Schools are working together to create pipelines where students can stack credentials as the work towards a career. East Tennessee State University recently had a Bachelor of Science Mechatronics Engineering program approved. This program is built for transfer with articulation agreements with two community colleges already on in place and additional agreements with TCATs expected soon. The program was developed in consultation with industry partners.

Tennessee’s institutions are also committed to creating programs that meet emerging needs. In May 2024, Tennessee Tech will present a Nuclear Engineering program to Tennessee’s Higher Education Commission (THEC) designed specifically to address Gov. Lee’s call to enhance Tennessee’s nuclear presence.

High School CTE Engineering and Other STEM Concentrators, 2021-22

CIP Code	Program Title	Educ. Award Level	Number of Grads	% Employed in TN	Estimated First Year Annual Wage
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician.	CTE HS	508	49%	\$39,041
15.9999	Engineering Technologies/Technicians, Other	CTE HS	928	50%	\$40,768

Multiple efforts are underway to expand engineering and STEM programming for secondary students. Tennessee is seeking to grow its pipeline of STEM workforce through its Future Workforce Initiative, which increases STEM training in K-12 schools.⁷¹ There are currently 88

⁷¹ Office of the Governor, [Press Release](#)

STEM and STE(A)M Designated Schools in Tennessee.⁷² The Tennessee STEM Innovation Network, in partnership with Vanderbilt, studied the impact of STEM school designation.⁷³ Their initial key findings suggest that the requirements within the designation rubric support schools in establishing their STEM culture and community.

The Engineering and Other STEM career cluster enrolled 7,000 Tennessee high school students in BioSTEM, Engineering, Technology, and Advanced STEM Applications in 2022-23. Enrolled students can earn industry credentials in Autodesk, Solidworks (Computer-Aided Design), and Intellitek robotics as part of the Engineering and Other STEM pathway. Memphis-Shelby County’s East High School TSTEM Academy created a “STEM fest” to celebrate student brilliance. The day consisted of experiments and hands-on projects that allowed students to showcase their creativity.

High schools are also partnering with employers to support the pipeline of engineering and STEM graduates. Toyota Motor Manufacturing (Toyota TN) has announced the launch of its Engineering, Manufacturing and Mechatronics (EM²) Institute in partnership with the Jackson- Madison School District.

Engineering and Other STEM Apprenticeship Completers, 2022

CIP Code	Program Title	Number of Completers 2022
15.0001	Applied Engineering Technologies/Technicians.	*
15.0305	Telecommunications Technology/Technician.	*
15.0899	Mechanical Engineering Related Technologies/Technicians, Other.	*
15.1702	Power Plant Technology/Technician.	*
41.0301	Chemical Technology/Technician.	14

⁷² Tennessee STEM Innovation Network, [STEM and STE\(A\)M Designated Schools](#)

⁷³ Tennessee STEM Innovation Network, [Vanderbilt and TSIN STEM School Designation Impact Report](#)

Data Sources and Methodology

This section outlines the data sources and methods for identifying in-demand occupations and aligned academic programs.

In-Demand Occupations

To measure in-demand jobs, the Center for Economic Research in Tennessee (CERT) analyzes postings, openings, and hires for an occupation relative to total number of individuals employed in the occupation. Occupations which meet at least two of these three requirements considered in-demand:

- The ratio of job postings (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.
- The ratio of hires (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.
- The ratio of projected annual job openings from 2020 to 2030 to employment for an occupation is greater than or equal to the median ratio for all occupations in the region.

To encourage job creation and skill development in high-quality jobs, occupations must meet a minimum wage threshold. All occupations identified as in-demand have a median wage which is at least 80 percent of the median wage for the region. This analysis is completed at the statewide level and for each of the 9 local workforce development areas (LWDAs). To ensure the identification of in-demand occupations across diverse regional economies, the methodology employs a minimum employment threshold of .04 percent of a region's total employment. This parameter is used to evaluate the significance of each occupation within the local labor market, facilitating a nuanced understanding of regional workforce needs, and supporting targeted economic development strategies.

Data Definitions and Sources:

Employment: Employment and wage data for each occupation and region are sourced primarily from the Tennessee Department of Labor and Workforce Development's May 2022 release of the Occupational Employment and Wage Estimates (OEWS). OEWS publication standards require redaction for employment figures for some occupations. In cases where OEWS has redacted information, and a 2020 employment estimate from the Tennessee Department of Labor and Workforce Development Long-Term Occupational Projections was

available, the 2020 employment estimate was used in place of the redaction to fully analyze as many occupations as possible.

Unique Job Postings: Unique job postings denote the number of de-duplicated job advertisements listed by companies on online career sites or job boards. De-duplication is a process used to count a job posting only once even if there are listings of the same job on multiple career websites or online jobs boards. The source for this data is the Tennessee Department of Labor and Workforce Development.⁷⁴

Projected Annual Openings: A projected annual opening for an occupation is the average annual employment change over ten years from the Tennessee Department of Labor and Workforce Development's Long-Term Occupational Projections added to the expected openings due to transfers and exits from the occupation.⁷⁵

Hires: A hire is reported by the Census Bureau's Quarterly Workforce Indicators (QWI) dataset when an individual's Social Security number appears on a company's payroll and was not there the quarter before. The QWI program produces a comprehensive tabulation of employment and wage information at the industry-level for workers covered by state unemployment insurance laws.

The hires data in this report is sourced from Lightcast, using a combination of proprietary job data, Bureau of Labor Statistics separation rates, and Census Bureau's QWI. This method models occupational hires by matching job growth with turnover rates, transforming industry hires into detailed occupational estimates for regional employment trend analysis.⁷⁶

⁷⁴ Advertised Job Data can be found at jobs4tnwfs.tn.gov by following the path: Labor Market Information > Supply and Demand Data > Menu (in the top left-hand corner of the webpage) > Data Trends > Advertised Job Data > Jobs by Occupations.

⁷⁵ The Tennessee Department of Labor & Workforce Development's 2020 – 2030 Long-Term Occupational Projections can be found at jobs4tnwfs.tn.gov by following the path: Labor Market Information > Occupation Data > Menu (in the top left-hand corner of the webpage) > Data Trends > Employment and Wage Data > Occupation Data > Occupation Employment and Projections (Long-Term).

⁷⁶ Lightcast, Hires Methodology, <https://kb.lightcast.io/en/articles/6957581-hires-methodology>

Aligned Academic Programs

An **aligned academic program**⁷⁷ is a training program preparing students for careers in an in-demand occupation. The skills and knowledge developed through completion of an aligned academic program are matched with the skills and knowledge required for success in an occupation informed by the Classification of Instructional Programs (CIP) to Standard Occupation Code (SOC) crosswalk developed in partnership between the Bureau of Labor Statistics and National Center for Education Statistics.⁷⁸ The educational programs are aligned with occupational completers in programs of study for the purpose of identifying shortages and surpluses of trained personnel within the workforce system.

This report uses Tennessee's P20 Connect statewide longitudinal data system. Tennessee's Department of Finance and Administration's Office of Evidence and Impact (OEI) analyzes postsecondary and high school CTE concentrators alongside unemployment insurance (UI) employment records and wages.

Student outcome data at the *postsecondary level* for the 2021-22 academic year include all public colleges: the Tennessee Colleges of Applied Technology (TCATs), TBR community colleges, six locally governed institutions, and four University of TN system colleges.⁷⁹ Twenty-two members of the Tennessee Independent Colleges and Universities Association (TICUA) are also included. All degree levels, from less than one-year certificates through doctoral and professional degrees are included and disaggregated by the six-digit CIP code. Cells with less than 10 awards are suppressed.

Student outcome data at *secondary level* reflect 2021-2022 high school career and technical education concentrators. For purposes of this report, concentrators reflect a student completing at least two course credits within a CTE program of study or career cluster.⁸⁰ Cells with less than 10 awards are suppressed.

Tennessee completers of registered apprenticeship in 2021-2022 are also included. As they are not currently in the P20 system, no wage or employment data are available. [Registered Apprenticeship programs](#) are those approved by the U.S. Department of Labor or a State

⁷⁷ This report includes registered apprenticeships, high school CTE Concentrators, and postsecondary degree completers in data for aligned academic programs. There are other training initiatives, like Industry Certifications, that are not currently captured due to data limitations.

⁷⁸ More information about BLS and NCES CIP to SOC Crosswalk can be found [here](#).

⁷⁹ This includes UT Health Science Center. UT Southern is not currently in the THEC Student Information System, so it is not a part of the P20 Connect postsecondary completions.

⁸⁰ CTE Concentrators have been defined by the U.S. Department of Education. As part of the Strengthening Career and Technical Education for the 21st Century Act (Perkins V), this definition changed, lessening the required course credit requirements from three to two. More detail about the changes to this definition can be found [here](#).

[Apprenticeship Agency](#) with an employer that has an occupational objective and standards for implementation and completion of the apprenticeship.⁸¹

OEI matches high school and postsecondary completers to Tennessee's UI data to identify graduates who are working in Tennessee and their wages two quarters after graduation. Graduates must be found employed in Tennessee for two quarters to be included in the share employed in Tennessee and wage outcomes. In cases where a graduate was found in only one quarter, they would be included in the graduates count but dropped for the measures of employed in Tennessee and wages.⁸² The sum of two quarters of wages is multiplied by two, then a median is found to estimate an annual wage for completers. This annual wage represents a first-year wage for degree completers. Individuals who remain enrolled in an education program are excluded from these wage figures.

⁸¹ More information about Registered Apprenticeships in Tennessee can be found [here](#). This analysis is limited to Federal Registered Apprenticeships.

⁸² This methodological improvement began with 2023 reporting. As a result, approximately 20 percent of graduates are not included in employment outcomes because of the more stringent employed in two terms (instead of employed in only one term).

Limitations

While this report illustrates the connection between in-demand occupations and academic supply, it is not an explicit gap analysis.^{83,84} Reporting agencies will continue to evaluate new data sources to enhance the comprehensiveness of Tennessee's supply for in-demand occupations.

- The Bureau of Labor Statistics' Occupational Employment and Wage Statistics (OEWS) which is a semiannual survey collecting data on wage and salary workers in nonfarm establishments excludes self-employed individuals. The exclusion of self-employed individuals may disproportionately impact select occupational areas which tend to have a high number of self-employed workers.⁸⁵
- Teachers are an occupational area that is under-represented in the data on job postings, which is one of the three indicators used in this report to identify demand.⁸⁶ Job postings data for teachers are decentralized at the local school district level. While there is a [TN Education Job Board](#), hosted by the Tennessee Department of Education, this is not a required space to post teacher jobs and is not a comprehensive listing of all teacher vacancies. As a result, teachers are under-represented among the in-demand occupations of this report. This is just one example of an occupation impacted by data limitations on the metrics for demand.
- Currently, academic supply is measured by degree completers, CTE Concentrators, and registered apprenticeships. As noted above, this measure does not include the current workforce. Additionally, this does not include other measures of occupational readiness, like industry certifications.⁸⁷ Tennessee does not have a centralized collection of all industry certification test takers or completers. Future reports will seek to improve the comprehensiveness of Tennessee's supply for in-demand occupations.

⁸³ Several academic programs provide training for specific occupations, and in some cases, a single academic program can provide training for multiple occupations, resulting in many possible training opportunities for occupations. Occupations without any clear connected training remain in in-demand clusters.

⁸⁴ Occupations without any clear connected training remain in in-demand clusters.

⁸⁵ Bureau of Labor Statistics, Small-business options: Occupational outlook for self-employed workers (May 2018), https://www.bls.gov/careeroutlook/2018/article/self-employment.htm?view_full

⁸⁶ This occupation is used as an example and is not meant to be exhaustive. These occupations illustrate how the methodology and occupational conditions relate to the three metrics for demand, which impact whether occupations are on the in-demand occupation list.

⁸⁷ An industry certification is a credential recognized by business and industry at the local, state, or national level. It could be an assessment, an examination or a license that is administered and recognized by an industry third-party or governing board. Industry certificates measure competency in an occupation, and they validate the knowledge base and skills that show mastery in a particular industry or mastery of a particular competency needed in a certain industry.