



Building Opportunities for Cleveland Residents: Aligning Demand and Supply of Professional and Technical Education

APPENDICES

SEPTEMBER 2014



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APPENDIX A

Sources and Notes



Educational Attainment

- » *Source: Anthony Carnevale, Nicole Smith, Jeff Strohl. "Recovery: Projections of Jobs and Education Requirements Through 2020," Center on Education and the Workforce, Georgetown Public Policy Institute, Georgetown University, June 2013.*
- » *Source: U.S. Census, American Community Survey, 5-Year Estimates, 2008-2012.*

Secondary Graduation Data

- » *Source: Ohio Department of Education, 2011-2012 School Year.*
- » *Source: District School Data, Cleveland Metropolitan School District, 2012-2013 School Year; and Ohio Department of Education, 2012-2013 Career-Technical Planning District Report Card.*
- » *Note: In simple terms, the 4-year graduation rate, as defined by the Ohio Department of Education, applies to the cohort class of 2012 who graduated within four years, i.e. students who entered the 9th grade in 2009 and graduated by 2012.*

Commuting Patterns

- » *Source: U.S. Census Bureau, OnTheMap Application and Longitudinal Employer-Household Dynamics, Origin-Destination Employment Statistics, Beginning of Quarter Employment, 2nd Quarter of 2011.*

Employment by Sector and Occupation

- » *Source: Quarterly Census of Employment and Wages (QCEW) Employees, Non-QCEW Employees & Self-Employed - EMSI 2014.2 Class of Worker. Data are for Cuyahoga County and Cleveland Metropolitan Statistical Area (Cuyahoga, Geauga, Medina, Lake, and Lorain counties with the inclusion of Summit County.)*

Wealth Industry Clusters

- » *Clusters were identified from the following three analyses on the Cleveland area economy:*
 1. *Regional Competitiveness Council for a Regional Economic Competitiveness Strategy for Northeast Ohio commissioned analysis prepared by Edward (Ned) Hill, “Economic Performance of Northeast Ohio 2000 to 2010,” Center for Economic Development, Levin College of Urban Affairs, Cleveland State University, July 2012.*
 2. *Brookings Institution, “Northeast Ohio Regional Business Plan,” prepared by the Fund for Our Economic Future with input from partners in Advance Northeast Ohio, April 2011.*
 3. *Richey Piiparinen and Jim Russell, “Globalizing Cleveland: A Path Forward,” The Center for Population Dynamics at the Maxine Goodman Levin College of Urban Affairs, Cleveland State University, May 2014.*
- » *Clusters are made up of companies that can belong to multiple industry sectors (for example, a “life sciences cluster” can include advanced manufacturing companies and health care organizations). They are important because these companies trade their goods and services outside the region. As trade is conducted outside of the area, these companies bring back net new dollars that support Cleveland residents and their families, local businesses, and government services. Furthermore, these so-called traded-sector companies “concentrate” in a region because they draw competitive advantage from proximity to a skilled workforce, to specialized suppliers, and to a shared base of sophisticated knowledge about their industry.*

Core Demand Index

- » *FutureWorks developed a weighted “Core Demand Index” to identify key professional and technical occupational areas across 96 3-digit Standard Occupational Classification (SOC) groups. The Standard Occupational Classification (SOC) system is used by federal statistical agencies to categorize workers and professions.*
- » *The analysis using the “Core Demand Index” narrowed a list of 96 occupational groups to a list of 41 key 3-digit professional and technical occupational areas tied to the five wealth clusters. These occupational areas show substantial demand, offer family-sustaining wages, and hold promise for future employment and income for Cleveland residents.*
- » *The 3-digit occupational groups were weighted along four variables: demand (job openings and real-time postings), family sustaining wage, total jobs in the economy, and projected growth in the economy. Each 3-digit occupational group was identified if it tied to the key wealth clusters. All data are for the Cleveland Metropolitan Statistical Area (Cuyahoga, Geauga, Medina, Lake, and Lorain counties) with the addition of Summit County. The sources for the variables are:*
 1. *Demand. Demand is a calculation of projected annual job openings (Bureau of Labor Statistics) and real-time job postings (Burning Glass Labor Insight) for occupations in the Metropolitan Statistical Area (MSA) with Summit County.*
 2. *Family Sustaining Wage. According to a national Living Wage Calculator developed by Amy K. Glasmeier at Massachusetts Institute of Technology, the hourly wage that an individual in Cuyahoga County must earn to support his/her family of four is \$17.62. FutureWorks’ index calculates if the mean wage of each occupational group “meets” the family sustaining wage standard (within 10 percent of the county average), is “below” the county wage standard (more than 10 percent below the county average), or is “above” the county wage standard (more than 10 percent above the county average).*

Core Demand Index (continued)

3. *Total Jobs.* This is a 2018 calculation of the total number of jobs in the MSA from EMSI's model of projected jobs from the U.S. Bureau of Labor Statistics using data from the Quarterly Census on Employment and Wages (QCEW). FutureWorks' index calculates if the share of total jobs in the occupational group is in the "top," "middle," or "bottom" third of total jobs in the economy of the MSA with Summit.
 4. *Projected growth.* FutureWorks uses EMSI's BLS projections of job growth from 2013 to 2018 to calculate if each occupational group is projected to have "high" growth (above 2 percent), "moderate" growth (0-2 percent), or "low" growth (less than 0 percent).
 5. *The 3-digit occupational groups were weighted along four variables: demand (job openings and real-time postings), family sustaining wage, total jobs in the economy, and projected growth in the economy. Each 3-digit occupational group was identified if it tied to the key wealth clusters. All data are for the Cleveland Metropolitan Statistical Area (Cuyahoga, Geauga, Medina, Lake, and Lorain counties) with the addition of Summit County.*
- » *Other local analyses should be used to supplement The Core Demand Index analysis to help characterize the type and scale of demand for each occupational group.*

Output of Cleveland Municipal School District Career and Technical Education

- » *Source: District School Data 2012-2013 School Year, Cleveland Metropolitan School District.*
- » *Source: Ohio Department of Education, 2012-2013 Career-Technical Planning District Report Card.*
- » *Source: Ohio Department of Education, 2011-2012, CTE Courses, Enrollments, Participant and Concentrator data for selected Cleveland Area school districts, Career and Technical Planning Districts. Data provided to authors.*

Output of Postsecondary Education

- » *Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), downloaded May 2014 from <http://nces.ed.gov/ipeds/>.*
- » *Note: Nationwide roughly 88% of all Associate Degrees are awarded by public, two-year postsecondary institutions, according to U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2011-2012.*
- » *Universe of colleges and universities included in analysis of postsecondary education on page 10.*

Notes on Demand Supply Alignment

- » *All data are for the Cleveland Metropolitan Statistical Area with Summit County unless otherwise noted.*

Notes on Demand Supply Alignment (continued)

- » *Annual demand is FutureWorks calculations of Burning Glass Labor Insight, real-time job postings, 2013, and U.S. Bureau of Labor Statistics, EMSI, job openings, 2013.*
- » *Family Sustaining Wage uses the Living Wage standard for 1 Adult, 1 Child and 2 Adults, 2 Children family from Amy K. Glasmeier, Living Wage Calculation for Cuyahoga County, Ohio, Massachusetts Institute of Technology, downloaded May 12, 2014, from <http://livingwage.mit.edu/counties/39035>.*
- » *County wage is from U.S. Bureau of Labor Statistics, Median Hourly Wage, 2013.*
- » *Credentials awarded are from the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS) for 2012. These are credentials awarded from two-year postsecondary institutions within a 20-mile radius of Cleveland and four-year postsecondary institutions within a 50-mile radius.*
- » *Required credentials by occupation is from the U.S. Bureau of Labor Statistics, accessed through Burning Glass Labor Insight, 2011.*
- » *Descriptions of occupations are from the U.S. Department of Labor, Employment & Training Administration and developed by the National Center for O*NET Development (Occupational Information Network--O*NET) and accessed through <http://www.mynextmove.org/>.*
- » *The numbers of degrees and credentials awarded in the demand-supply tables of this section will not directly match the numbers of degrees awarded in the Talent Supply Postsecondary Education section because of slight differences in the data sources' definitions of the occupations and differences in the selected occupations included in the demand and supply charts.*

Notes on Demand Supply Alignment (continued)

- » *Our demand supply model does not capture every pathway to employment, i.e., apprenticeships, temp agencies, etc. The academic pathway has been our focus. The connection to some jobs we have selected, like construction, include many non-academic pathways.*

COLLEGES AND UNIVERSITIES INCLUDED IN THE ANALYSIS

- » *ATS Institute of Technology*
- » *Baldwin Wallace University*
- » *Brown Mackie College-North Canton*
- » *Bryant & Stratton College-Cleveland*
- » *Bryant & Stratton College-Eastlake*
- » *Bryant & Stratton College-Parma*
- » *Case Western Reserve University*
- » *Central School of Practical Nursing*
- » *Cleveland Clinic Health System-School of Diagnostic Imaging*
- » *Cleveland Institute of Art*
- » *Cleveland Institute of Dental-Medical Assistants-Cleveland*
- » *Cleveland State University*
- » *Cuyahoga Community College District*
- » *Cuyahoga Valley Career Center*
- » *Hiram College*
- » *ITT Technical Institute-Strongsville*
- » *ITT Technical Institute-Warrensville Heights*
- » *John Carroll University*
- » *Kaplan Career Institute-Cleveland*
- » *Kent State University at Kent*
- » *Kent State University at Stark*
- » *Kent State University at Trumbull*
- » *Lake Erie College*
- » *Lakeland Community College*
- » *Lorain Community College*
- » *Lincoln College of Technology-Cleveland*
- » *Malone University*
- » *Miami-Jacobs Career College-Independence*
- » *National College-Willoughby Hills*
- » *Northeast Ohio Medical University*
- » *Notre Dame College*
- » *Ohio Center for Broadcasting-Valley View*
- » *Ohio Technical College*
- » *Polaris Career Center*
- » *Remington College-Cleveland Campus*
- » *Remington College-Cleveland West Campus*
- » *Sanford-Brown College-Middleburg Heights*
- » *South University-Cleveland*
- » *University of Akron Main Campus*
- » *University of Phoenix-Cleveland Campus*
- » *Willoughby-Eastlake School of Practical Nursing*

CAREER TECHNICAL PLANNING DISTRICTS AND MEMBER SCHOOL DISTRICTS IN THE CLEVELAND AREA

Cleveland Municipal Tri-Heights Career Prep Consortium	Cleveland Municipal School District
East Cleveland	Cleveland Heights-University Heights, Shaker Heights, Warrensville Heights
Lakewood	East Cleveland
Maple Heights-Bedford	Bay Village, Lakewood, Rocky River, Westlake
Mayfield Excel TECC	Bedford, Maple Heights
Parma	Aurora, Beachwood, Chagrin Falls Exempted Village, Mayfield, Orange, Richmond Heights Local, Solon, South Euclid-Lyndhurst, West Geauga Local
Cuyahoga Valley	Parma
Polaris	Brecksville-Broadview Heights City, Cuyahoga Heights Local, Cuyahoga Valley Career Center JVSD, Garfield Heights City, Independence Local, Nardon Hills City, North Royalton City, Revere Local, Twinsburg City
Auburn	Berea City, Brooklyn City, Fairview Park City, North Olmsted City, Olmsted Falls City, Polaris JVSD, Strongsville City
Four City Compact	Auburn JVSD, Berkshire Local, Cardinal Local, Chardon Local, Fairport Harbor Exempted Village, Kenston Local, Kirtland Local, Madison Local, Newbury Local, Painesville City Local, Perry Local, Riverside Local
Lake Shore Compact	Barberton, Copley-Fairlawn, Norton, Wadsworth
Lorain	Euclid, Mentor Exempted Village, Wickliffe, Willoughby-Eastlake
Lorain County	Lorain City
Six District Voc Ed Compact	Lorain County
	Hudson, Cuyahoga Falls, Kent, Stow-Munroe Falls, Tallmadge, Woodridge Local



APPENDIX B

Job Demand



FutureWorks developed a weighted “Core Demand Index” to identify key occupational areas tied to the five wealth clusters that show substantial demand, offer family sustaining wages, and hold promise for future employment and income for city residents.

The variables that make up the “Core Demand Index” include:

- » *Occupational Group. This is a category of worker and profession identified as part of the Standard Occupational Classification (SOC) system used by federal statistical agencies.*
- » *Demand. Demand is a calculation of projected annual job openings (Bureau of Labor Statistics) and real-time job postings (Burning Glass Labor Insight) for occupations in the Metropolitan Statistical Area (MSA).*
- » *Family Sustaining Wage. According to a national Living Wage Calculator developed by Amy K. Glasmeier at Massachusetts Institute of Technology, the hourly wage that an individual in Cuyahoga County must earn to support his/her family of four is \$17.62. FutureWorks’ index calculates if the mean wage of each occupational group “meets” the family sustaining wage standard (within 10 percent of the county average), is “below” the county wage standard (more than 10 percent below the county average), or is “above” the county wage standard (more than 10 percent above the county average).*
- » *Total Jobs. This is a 2018 calculation of the total number of jobs in the MSA from EMSI’s model of projected jobs from the U.S. Bureau of Labor Statistics using data from the Quarterly Census on Employment and Wages (QCEW). FutureWorks’ index calculates if the share of total jobs in the occupational group is in the “top,” “middle,” or “bottom” third of total jobs in the economy of the MSA.*
- » *Projected Growth. FutureWorks uses EMSI’s BLS projections of job growth from 2013 to 2018 to calculate if each occupational group is projected to have “high” growth (above 2 percent), “moderate” growth (0-2 percent), or “low” growth (less than 0 percent).*

The analysis of the “Core Demand Index” resulted in a group of 41 occupational areas that ranked as higher demand, higher wage, and closely linked to the Cleveland metro’s wealth clusters. These occupational areas became the target group for which FutureWorks further analyzed the alignment of demand and the supply of talent. This list of 41 occupational groups is shown in the blue tables that follow in this section of the appendix.

A second group of 53 occupational areas, shown in the gold color set of tables in this section of the appendix, did not reach our threshold for further analysis of demand-supply alignment, even though some may have ranked highly on some of the variables.

Both sets of tables show the detailed data under each of the variables.

Other local analyses should be used to supplement The Core Demand Index analysis to help characterize the type and scale of demand for each occupational group.

Job Demand in High Wealth Sectors

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX				
Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Computer and IT Workers	11,204	\$32.13	37,133	6%
Health Diagnosing and Treating Practitioners	8,517	\$42.85	67,119	9%
Other Management Occupations	5,412	\$31.24	28,484	(1%)
Business Operations Specialists	4,806	\$27.58	42,979	3%
Information and Record Clerks	4,616	\$15.20	45,375	1%
Sales Representatives, Wholesale and Manufacturing	3,874	\$28.34	20,000	(3%)
Financial Specialists	3,792	\$29.29	23,629	(1%)
Health Technologists and Technicians	3,527	\$21.33	36,042	9%
Advertising, Marketing, Promotions, Public Relations, and Sales Managers	3,398	\$49.95	6,345	1%
Engineers	3,048	\$38.83	15,167	2%
Secretaries and Administrative Assistants	2,708	\$17.01	43,389	5%
Operations Specialties Managers	2,680	\$44.27	18,293	(1%)
Financial Clerks	2,599	\$16.04	34,722	(1%)
Installation, Maintenance, and Repair Workers	2,350	\$18.51	27,670	3%

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Nursing and Home Health Aides	2,069	\$10.46	43,357	14%
Metal and Plastic Workers	1,888	\$17.36	37,114	(9%)
Other Office and Administrative Support Workers	1,545	\$14.30	39,740	0%
Other Production Occupations	1,529	\$14.62	26,737	(4%)
Other Health Care Support Occupations	1,157	\$14.12	15,802	8%
Construction Trade Workers	1,031	\$20.57	37,927	(1%)
Art and Design Workers	962	\$18.94	5,097	(7%)
Top Executives	936	\$49.39	18,631	2%
Supervisors of Office and Administrative Support Workers	875	\$23.18	11,518	1%
Drafters, Engineering Technicians, and Mapping Technicians	762	\$24.27	6,393	(1%)
Media and Communications Workers	628	\$21.11	6,109	(3%)
Supervisors of Production Workers	598	\$26.23	6,463	(7%)
Assemblers and Fabricators	589	\$13.77	17,333	(8%)
Electrical and Electronic Equipment Mechanics, Installers, and Repairers	477	\$22.45	5,699	(2%)

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Life, Physical, and Social Science Technicians	426	\$21.23	2,727	2%
Physical Scientists	379	\$33.65	2,233	2%
Supervisors of Installation, Maintenance, and Repair Workers	313	\$28.42	3,789	2%
Occupational Therapy and Physical Therapist Assistants and Aides	311	\$25.21	2,179	12%
Life Scientists	309	\$34.43	1,127	10%
Mathematical Science Occupations	252	\$37.08	1,256	8%
Social Scientists and Related Workers	191	\$35.11	1,508	1%
Other Health Care Practitioners and Technical Occupations	163	\$23.26	1,880	5%
Plant and System Operators	145	\$25.56	2,460	(1%)
Architects, Surveyors, and Cartographers	142	\$27.84	1,563	13%
Media and Communications Equipment Workers	129	\$17.22	2,231	8%
Supervisors of Construction and Extraction Workers	76	\$25.06	3,540	(2%)
Extraction Workers	19	\$21.61	245	4%

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Retail Sales Workers	4,311	\$9.74	70,895	(1%)
Motor Vehicle Operators	3,119	\$15.11	32,473	0%
Food and Beverage Serving Workers	2,997	\$9.06	70,992	3%
Supervisors of Sales Workers	2,064	\$18.36	14,678	(2%)
Material Recording, Scheduling, Dispatching, and Distributing Workers	1,820	\$15.37	37,766	(4%)
Material Moving Workers	1,705	\$11.61	38,700	(1%)
Other Personal Care and Service Workers	1,515	\$9.83	22,820	12%
Counselors, Social Workers, and Other Community and Social Service Specialists	1,504	\$21.06	16,217	7%
Sales Representatives, Services	1,461	\$25.84	19,585	0%
Supervisors of Food Preparation and Serving Workers	1,369	\$14.90	8,961	3%
Preschool, Primary, Secondary, and Special Education School Teachers	1,345	\$28.18	38,773	2%
Building Cleaning and Pest Control Workers	1,244	\$10.40	34,754	6%
Vehicle and Mobile Equipment Mechanics, Installers, and Repairers	946	\$17.53	14,287	4%
Cooks and Food Preparation Workers	910	\$10.43	23,736	3%

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Other Protective Service Workers	905	\$11.96	16,056	4%
Lawyers, Judges, and Related Workers	843	\$45.35	8,230	0%
Other Sales and Related Workers	764	\$15.49	11,900	(3%)
Personal Appearance Workers	654	\$10.47	13,302	14%
Other Food Preparation and Serving Related Workers	540	\$9.11	11,132	1%
Entertainers and Performers, Sports and Related Workers	498	\$18.97	5,702	2%
Legal Support Workers	471	\$22.10	4,026	3%
Grounds Maintenance Workers	442	\$11.22	14,326	14%
Other Teachers and Instructors	391	\$19.81	11,553	3%
Other Education, Training, and Library Occupations	372	\$15.11	10,675	3%
Law Enforcement Workers	241	\$26.59	9,307	(2%)
Entertainment Attendants and Related Workers	229	\$12.29	3,428	17%
Supervisors of Building and Grounds Cleaning and Maintenance Workers	201	\$18.37	2,803	9%
Supervisors of Transportation and Material Moving Workers	198	\$22.46	3,507	(2%)

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Food Processing Workers	174	\$12.08	4,356	3%
Textile, Apparel, and Furnishings Workers	174	\$11.07	3,486	(12%)
Postsecondary Teachers	172	\$32.02	12,172	7%
Other Transportation Workers	169	\$11.58	2,669	2%
Other Construction and Related Workers	134	\$22.71	4,322	1%
Religious Workers	134	\$19.23	3,734	4%
Supervisors of Personal Care and Service Workers	124	\$15.16	1,508	16%
Librarians, Curators, and Archivists	123	\$23.18	3,111	3%
Animal Care and Service Workers	115	\$9.95	1,921	7%
Printing Workers	115	\$16.72	3,060	(11%)
Fire Fighting and Prevention Workers	96	\$23.74	5,351	(4%)
Air Transportation Workers	81	\$41.93	1,951	10%
Supervisors of Protective Service Workers	78	\$30.25	2,270	(1%)
Agricultural Workers	75	\$11.13	2,192	(6%)

DATA DETAIL FOR ANALYSIS OF OCCUPATIONAL GROUPS USING CORE DEMAND INDEX

Occupational Group	Demand 2013	Median Hourly Earning 2013	Total Jobs 2018	Projected Growth 2013-2018
Communications Equipment Operators	52	\$12.55	1,539	(5%)
Woodworkers	43	\$15.46	1,245	(27%)
Baggage Porters, Bellhops, and Concierges	42	\$10.36	342	10%
Water Transportation Workers	28	\$27.41	154	(30%)
Rail Transportation Workers	22	\$26.26	567	(3%)
Helpers, Construction Trades	21	\$14.83	1,128	3%
Tour and Travel Guides	20	\$11.73	287	12%
Forest, Conservation, and Logging Workers	19	\$15.52	166	12%
Funeral Service Workers	16	\$15.48	977	2%
Supervisors of Farming, Fishing, and Forestry Workers	7	\$27.27	108	(4%)
Military Occupations	0	\$18.43	7,155	(3%)



APPENDIX C

Demand Supply Alignment



Demand Supply Alignment

FutureWorks analyzed the characteristics of demand and supply for key professional and technical occupations identified through the “Core Demand Index.” Each of these occupational groups is tied to the five wealth clusters and shows substantial demand, offers family sustaining wages, and holds promise for future employment and income for city residents.

FutureWorks characterizes and analyzes demand-supply alignment for each occupational group along the following dimensions:

- » *Overview. The occupational overview describes the key functions and characteristics of the occupation and identifies types of knowledge needed, technical skills in demand, and top employers hiring for the occupation in the Metropolitan Statistical Area (MSA). Descriptions of occupations are from the U.S. Department of Labor, Employment & Training Administration and developed by the National Center for O*NET Development. Data for technical skills in demand and top employers hiring are from Burning Glass Labor Insight real-time job postings.*
- » *Numbers At A Glance. The at-a-glance data characterize the demand and supply for each key occupational group. Annual demand is for 2013 based on FutureWorks calculations of Burning Glass Labor Insight real-time job postings and EMSI projections of job openings from the U.S. Bureau of Labor Statistics (BLS). Credentials awarded is from U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), 2013. The median hourly wage is for 2013 from BLS. The family sustaining wage is for 2013 sourced from Amy K Glasmeier, Living Wage Calculation for Cuyahoga County, Ohio, Massachusetts Institute of Technology, downloaded May 12, 2014 from <http://livingwage.mit.edu/counties/39035> for 1 adult, 1 child and 2 adults, 2 children families.*

» *Data Breakdown. FutureWorks further details demand-supply data for the occupational group and for selected occupations within each group. That is, the data FutureWorks presents here are for the key occupational group identified in the “Core Demand Index” and for a number of selected sub-occupations that make-up that group. In terms of the Standard Occupational Classification system, federal agencies identify the key occupational group as a 3-digit SOC occupation and the sub-occupations as 6-digit SOC occupations. The data in these tables are from the same sources in the “Numbers At A Glance” charts with the additional data for the credentials required for the 6-digit sub-occupations sources from BLS through Burning Glass Labor Insight for the United States, 2011.*

As referenced previously, it is important to note that the projections in the analysis of the “Core Demand Index” and the demand-supply alignment are dependent on the forecast for job creation and real-time demand in each occupational group. The forecasts and measures of demand are from EMSI’s model of U.S. Bureau of Labor Statistics data and Burning Glass Labor Insight real-time job postings. In addition, numbers of credentials awarded in the demand-supply alignment tables of the appendix will not match the numbers for degrees in the Talent Supply section of the main report because of the different definitions and occupations within each section. Our demand supply model does not capture every pathway to employment, i.e., apprenticeships, temp agencies, etc. The academic pathway has been our focus.

Computer and IT Workers: Overview

Description

Computer and IT Workers span sectors and fulfill critical roles in many of the employment and wealth-generating economic sectors (biosciences and health care, advanced manufacturing, information technology, and financial, business services, and back office support).

Workers in this occupation provide technical assistance to computer users; analyze data processing problems to implement and improve computer systems or develop IT solutions; create, modify, and test the code, forms, and script that allow computer applications to run; monitor and ensure network and perform maintenance to support network availability.

There are good entry points and mobility for workers in the field. The occupation and industry has clear career pathways marked by widely recognized industry credentials at all levels of the educational spectrum.

Knowledge Needed

- » Engineering and Technology: computers and electronics
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics
- » Product and Service Development

Technical Skills in Demand

- » SQL, Oracle, .NET Programming, Microsoft C#, JAVA

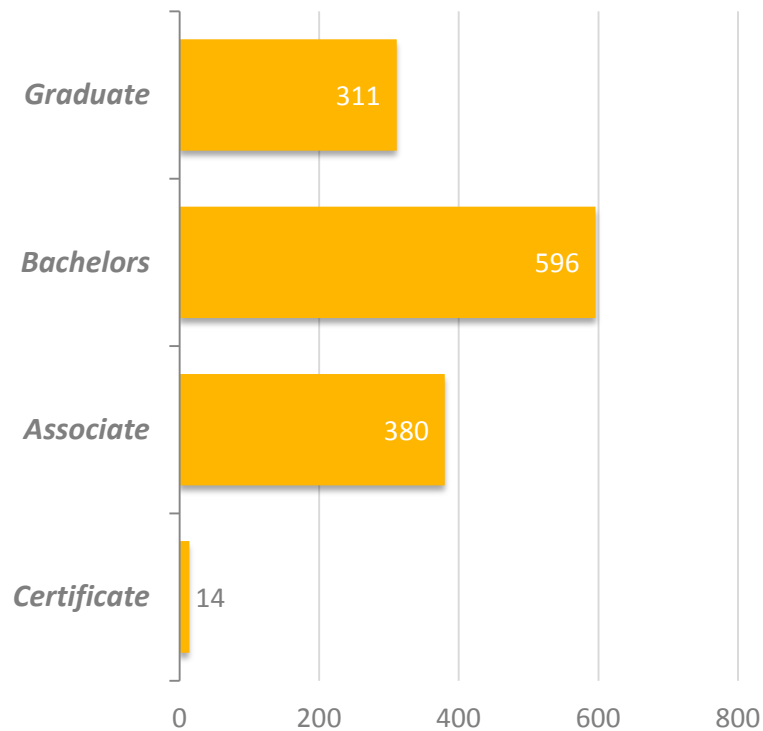
Top Employers Hiring

- » Cleveland Clinic
- » Progressive Insurance
- » Exodus Integrity Services
- » Sherwin Williams
- » Rockwell Automation Incorporated
- » Keycorp

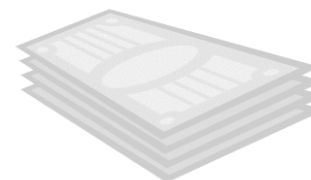
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$33.03

County Livable Wage
\$17.62

Computer and IT Workers : Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Computer and IT Workers	11,204	\$33.03	14	380	596	311

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Software Developers, Applications	2,745	\$37.35	3%	15%	82%
Computer Workers General	2,432	\$38.32	13%	42%	45%
Computer Systems Analysts	1,755	\$34.72	6%	24%	70%
Computer User Support Specialists	1,108	\$20.43	13%	48%	39%
Network and Computer Systems Administrators	683	\$32.64	8%	46%	46%
Computer Programmers	665	\$31.27	7%	25%	69%
Database Administrators	620	\$31.33	7%	27%	66%
Web Developers	423	\$25.08	8%	32%	61%

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Metal and Plastic Workers: Overview

Description

Metal and Plastic Workers is a subgroup of Production and Manufacturing Workers.

Workers in this occupation set up and operate a variety of machine tools to produce precision parts and instruments; lay out, machine, fit, and assemble castings and parts to metal or plastic foundry patterns, core boxes, or match plates; develop programs to control machining or processing of metal or plastic; use hand-held equipment to join or cut metal or plastic components.

There is good career mobility within the industry with entry points that require a postsecondary credential less than a Bachelor's Degree.

Knowledge Needed

- » Engineering and Technology: mechanical, design
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics, physics
- » Manufactured Goods: manufacture and distribution of products

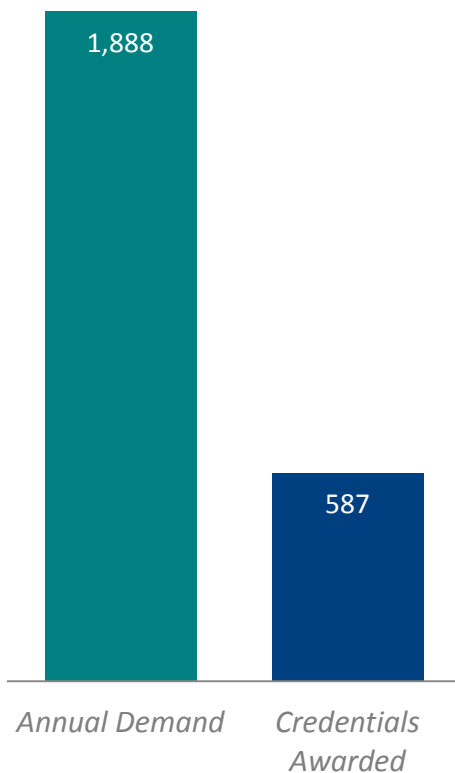
Technical Skills in Demand

- » Machining, Computer Numerical Control (CNC), Blueprints, Lathes, Calipers, Micrometer Measuring

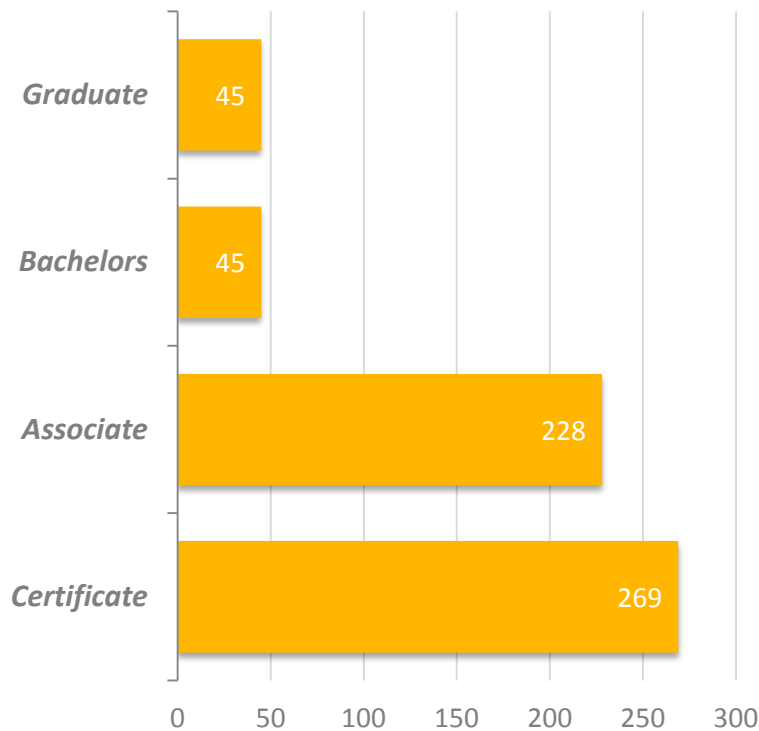
Top Employers Hiring

- » The Babcock & Wilcox Company
- » Amotec Incorporated
- » Clark Reliance Corporation
- » Snap Rite Manufacturing
- » Parker Hannifin

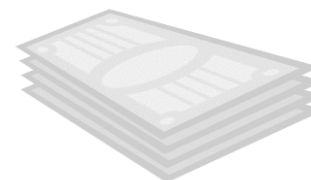
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$17.36

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Metal and Plastic Workers	1,888	\$17.36	269	228	45	45

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Computer-Controlled Machine Tool Operators	589	\$17.15	50%	43%	7%
Machinists	316	\$17.94	57%	40%	3%
Welders, Cutters, Solderers, and Brazers	280	\$17.23	73%	26%	2%
Press Machine Setters, Operators, and Tenders	137	\$14.71	78%	20%	2%
Machine Tool Setters, Operators, and Tenders	72	\$15.52	80%	18%	2%
Tool and Die Makers	68	\$28.17	49%	46%	4%

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Description

Installation, Maintenance, and Repairers work in manufacturing and construction related industries.

Workers in this occupation perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair; use tools ranging from power tools to precision measuring instruments and electrical and electronic testing devices; inspect, operate, test, and diagnose machinery.

The occupational group offers wages close to or just above the livable wage. Most positions require less than a four-year degree; many offer good entry-level positions with some technical postsecondary training.

Knowledge Needed

- » Engineering and Technology: mechanical, electronics and computers, building and construction
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics
- » Product Design and Service Development

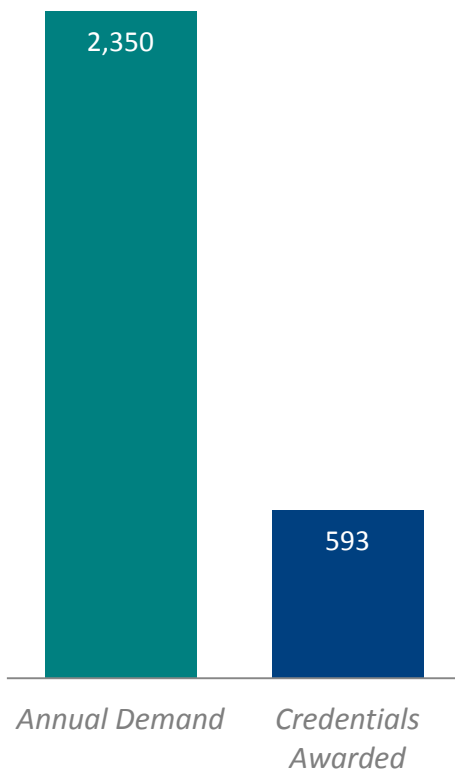
Technical Skills in Demand

- » Industrial Control Mechanics, Welding, Hand Tools, CAD, Blueprints, Schematic Diagrams

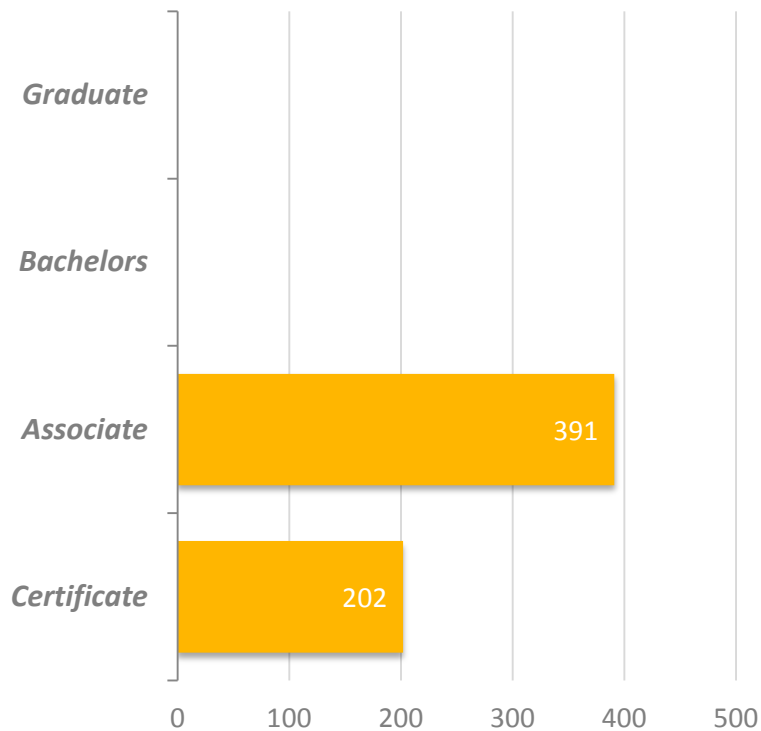
Top Employers Hiring

- » Cleveland Clinic
- » Goodyear
- » Sears
- » Time Warner
- » Arco Comfort Air
- » Swagelok

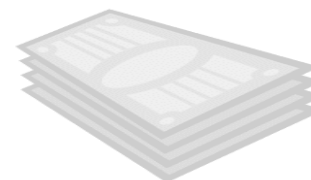
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$18.51

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Installation, Maintenance, and Repair	2,350	\$18.51	202	391	0	0

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Maintenance and Repair Workers, General	1,378	\$16.87	59%	35%	5%
Installation, Maintenance, and Repair Workers, Other	391	\$18.08	56%	35%	9%
HVAC Mechanics and Installers	183	\$19.89	55%	41%	4%
Industrial Machinery Mechanics	91	\$21.10	54%	40%	6%
Communications Line Installers and Repairers	68	\$22.87	45%	46%	9%

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Skilled Production Workers: Overview

Description

Skilled Production Workers include a diverse group of production-related positions. There are three key categories in the group: assemblers is one, inspectors and testers is a second, and repairers and installers is the third.

Workers in this occupation have responsibility for assembling an entire product or component of a product; perform quality checks on products and parts; inspect and test materials, products, and installations according to specifications; and repair, adjust, or install electronic equipment, such as industrial controls & transmitters.

Many of the positions in this occupational group, especially assembly and fabricator positions, have wages that are below the county's livable wage. Repairers often require some postsecondary credential (but less than an two-year degree) while assemblers and fabricators have relatively low educational requirements.

Knowledge Needed

- » Engineering and Technology: computers and electronics, mechanical
- » Math and Science: basic arithmetic, algebra, and geometry
- » Manufacture and Distribution of Products

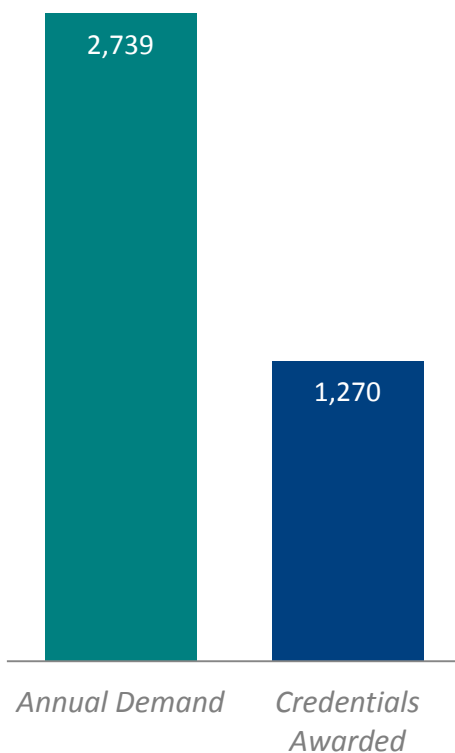
Technical Skills in Demand

- » Inspection, Blueprints and Technical Specifications, Operating Hand and Power Tools

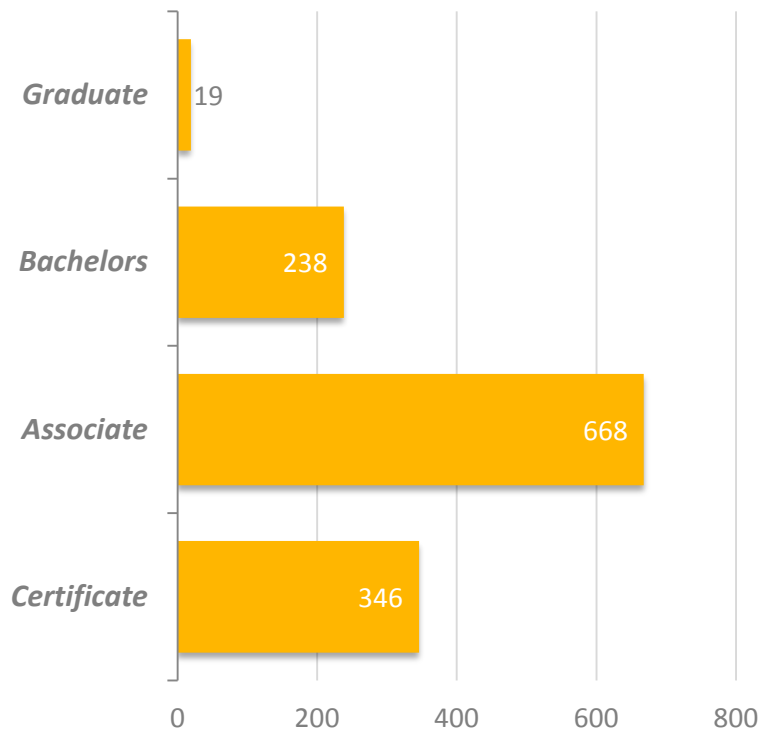
Top Employers Hiring

- » AT&T
- » Compucom
- » CGI Group
- » Amotec Incorporated
- » Nestle USA Incorporated
- » Cintas

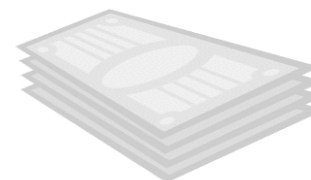
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$16.38

County Livable Wage
\$17.62

Skilled Production Workers: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Skilled Production Workers	2,739	\$16.38	346	668	238	19

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Inspectors, Testers, Sorters, Samplers, and Weighers	467	\$16.95	50%	35%	15%
Production Workers, General	384	\$12.23	70%	26%	4%
Team Assemblers	225	\$13.22	69%	27%	4%
Assemblers and Fabricators, All Other	179	\$14.00	69%	27%	4%
Computer, Automated Teller, and Office Machine Repairers	171	\$16.96	23%	54%	23%
Helpers--Production Workers	127	\$11.57	69%	28%	3%
Telecommunications Equipment Installers and Repairers, Except Line Installers	100	\$26.35	37%	52%	11%

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Construction Trades Workers: Overview

Description

Construction Trades Workers include a diverse group of positions, including electricians, plumbers, steamfitters and pipefitters, equipment operators, and sheet metal workers.

Workers in this occupation perform tasks involving physical, electrical and technical specifications at construction sites. Lay out, assemble, install, or maintain systems, supports, or related hydraulic or pneumatic equipment or other powered tools. Ensure that work is in accordance with relevant codes.

Workers in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers. A recognized apprenticeship program may be associated with these occupations.

Knowledge Needed

- » Engineering and Technology: mechanical, building and construction
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics

Technical Skills in Demand

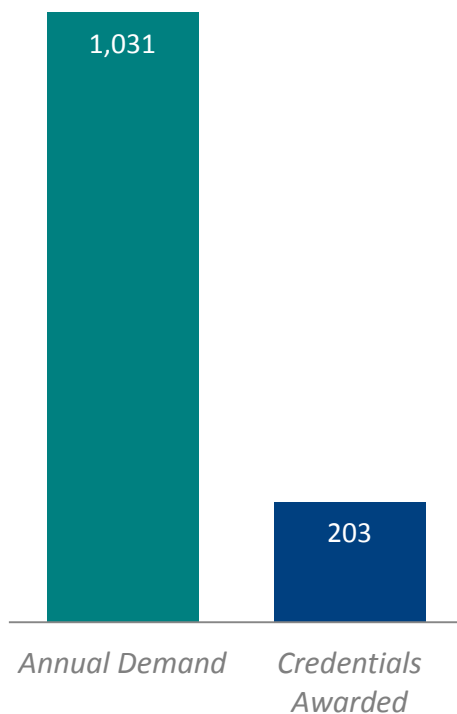
- » Electrical work, Reading blueprints and technical specifications, CAD, Project management software, Project estimation

Top Employers Hiring

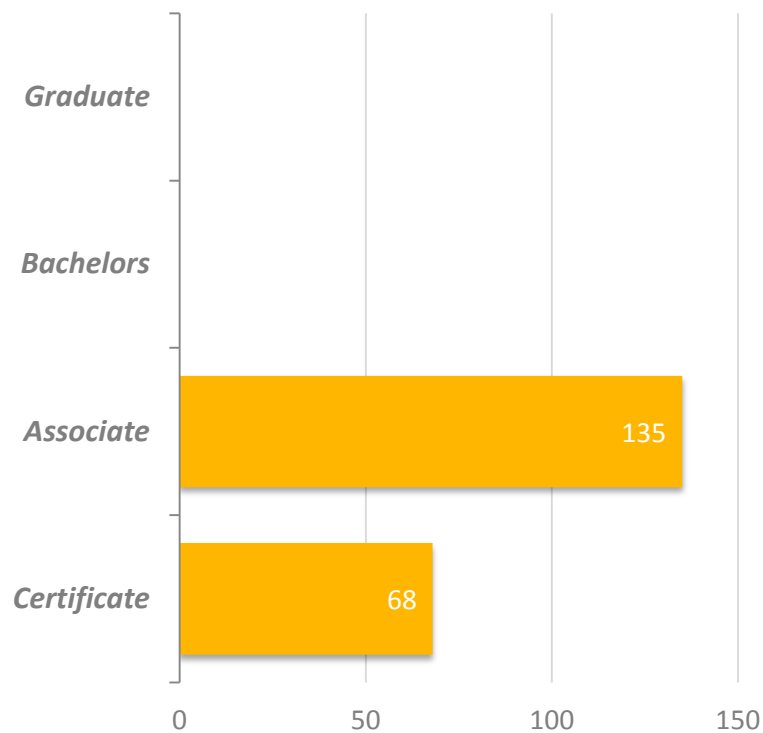
- » Preferred LLC
- » Corrpro Company Incorporated
- » Jones Lang Lasalle Incorporated
- » Waste Management
- » Aegion Corporation

Note: Additional information on construction can be found in the “Demand Study for Construction Employees” prepared by Mohr Partners Cleveland, W.E. Upjohn Institute for Employment Research, and Weber Murphy Fox for The Construction Diversity Committee, Commission on Economic Inclusion, Greater Cleveland Partnership.

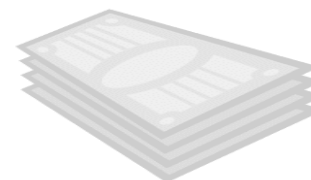
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$20.57

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Construction Trade Workers	1,031	\$20.57	68	135	0	0

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Construction Laborers	236	\$15.55	74%	21%	4%
Electricians	222	\$27.17	48%	46%	6%
Carpenters	115	\$18.38	68%	26%	6%
Plumbers, Pipefitters, and Steamfitters	98	\$24.12	67%	30%	4%
Roofers	68	\$16.58	82%	16%	2%
Painters, Construction and Maintenance	67	\$20.08	73%	21%	6%
Operating Engineers and Other Construction Equipment Operators	66	\$25.42	75%	21%	3%

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Health Diagnosing and Treating Practitioners: Overview

Description

Health Diagnosing and Treating Practitioners are a subgroup of the large set of health care-related occupations in the region. They are the highest trained group of workers in health care (e.g. doctors, nurses, nurse practitioners, pharmacists).

Workers in this occupation diagnose and treat acute, episodic, or chronic illness, independently or as part of a health care team; order, perform, or interpret the results of diagnostic tests; prescribe medication.

The industry is highly regulated, which sets up established educational pathways and credentials needed. Most of the positions in this group of health care workers require a Bachelor's or advanced degree.

Knowledge Needed

- » Health: medicine, therapy and counseling
- » Math and Science: psychology and biology
- » Business: customer service

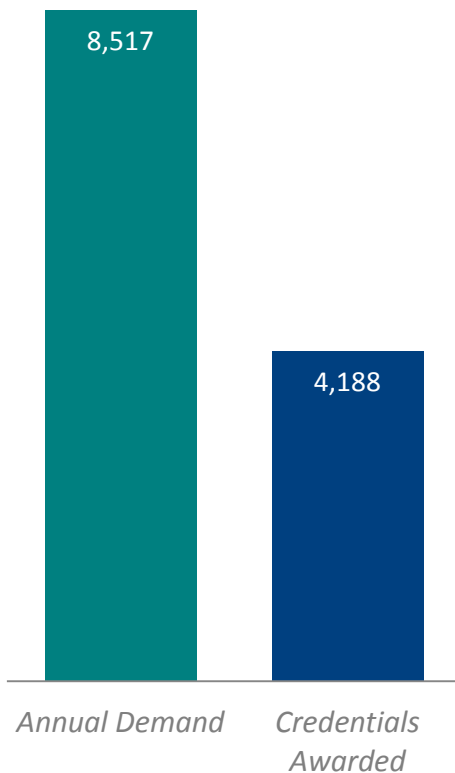
Technical Skills in Demand

- » Treatment Planning and Diagnosis, Advanced Cardiac Life Support, Medical PDAs, Electronic Medical Records (EMR)

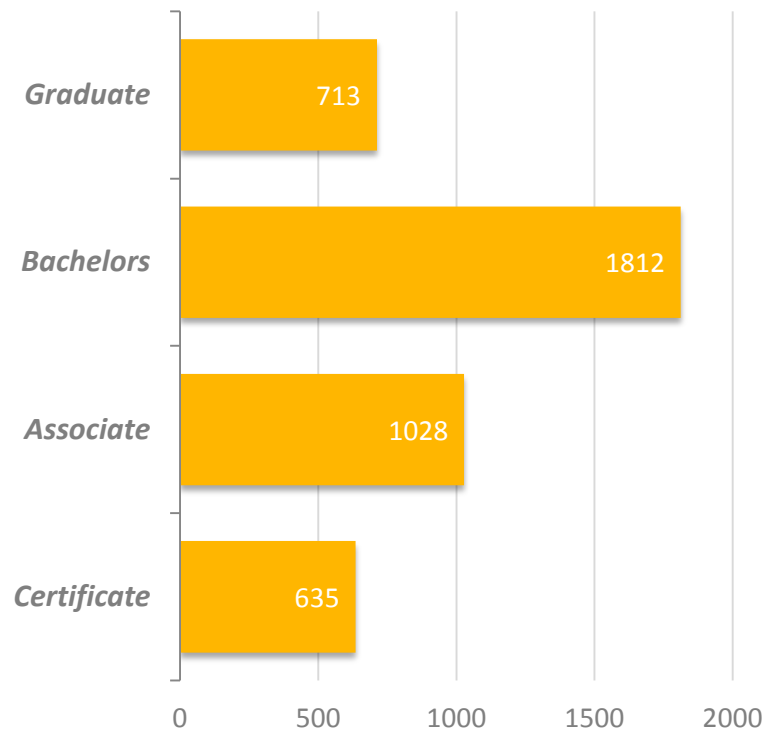
Top Employers Hiring

- » Cleveland Clinic
- » Southwest General Health Center
- » Akron Childrens Hospital
- » University Hospitals
- » Kindred Healthcare Incorporated
- » Metrohealth System

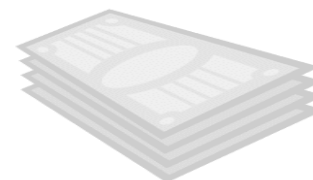
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$42.85

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Health Diagnosing and Treating Practitioners	8,517	\$42.85	635	1,028	1,812	713

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Registered Nurses	4,729	\$31.37	1%	44%	55%
Nurse Practitioners	680	\$42.28	0%	3%	97%
Physician Assistants	416	\$44.11	5%	21%	74%
Occupational Therapists	374	\$39.70	1%	10%	89%
Physical Therapists	344	\$39.93	2%	8%	90%
Pharmacists	277	\$57.65	0%	5%	95%

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Health Technologists and Technicians: Overview

Description

Health Technologists and Technicians is a subgroup of the larger set of health care occupations. While colleges and high schools produce many graduates in health fields, there remains unmet demand for technicians in high wage fields.

Workers in this occupation care for ill, injured, or convalescing patients in hospitals, nursing homes, clinics, private homes, group homes, and similar institutions; perform routine medical tests for the diagnosis, treatment, and prevention of disease.

Industry is highly regulated, which sets up established educational pathways and credentials needed. Lots of mobility and career opportunities within the profession. Good entry points that require a postsecondary credential that is less than a Bachelor's degree.

Knowledge Needed

- » Health: medicine, therapy and counseling
- » Math and Science: biology, chemistry, psychology, arithmetic, algebra, geometry, calculus, or statistics
- » Business: customer service and management

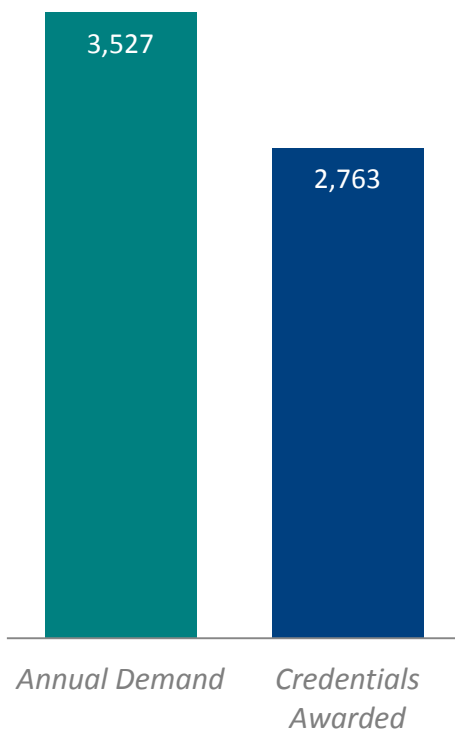
Technical Skills in Demand

- » Medical Coding, Electronic Medical Record (EMR) software, Personal Digital Assistants (PDA), Medical and Laboratory Information Systems

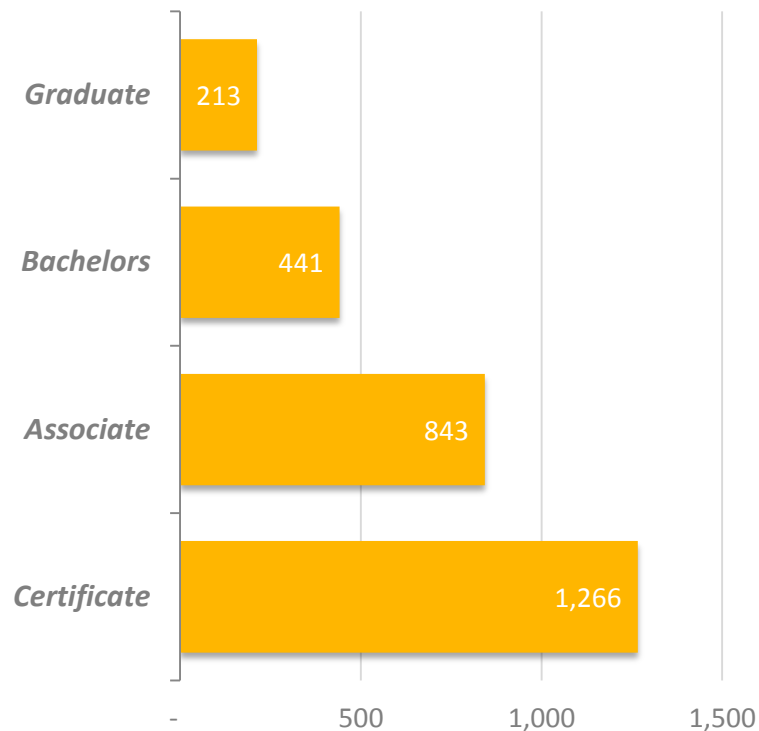
Top Employers Hiring

- » Cleveland Clinic
- » Southwest General Health Center
- » University Hospitals
- » Summa Western Reserve Hospital
- » Lutheran Hospital

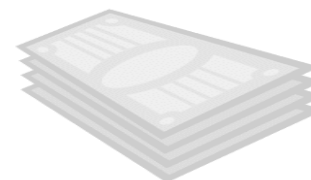
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$21.53

County Livable Wage
\$17.62

Health Technologists and Technicians: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Health Technologists and Technicians	3,527	\$21.33	1,266	843	441	213

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Licensed Practical and Licensed Vocational Nurses	779	\$21.07	21%	74%	5%
Medical Records and Health Information Technicians	531	\$18.03	32%	51%	16%
Medical and Clinical Laboratory Technicians	456	\$20.83	13%	36%	51%
Health Technologists and Technicians, All Other	289	\$20.16	24%	50%	27%
Pharmacy Technicians	231	\$14.28	27%	55%	18%
Emergency Medical Technicians and Paramedics	216	\$15.80	15%	72%	13%
Medical and Clinical Laboratory Technologists	209	\$27.31	13%	36%	51%
Radiologic Technologists	143	\$25.38	10%	67%	23%

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Healthcare Therapist Aides and Support Workers: Overview

Description

Therapist Aides and Support Workers are a subgroup of the health care occupational group.

Workers in this occupation assist therapists in providing therapy treatments and procedures; may, in accordance with state laws, assist in the development of treatment plans, carry out routine functions, document the progress of treatment, and modify specific treatments in accordance with patient status and within the scope of treatment plans established by a therapist.

The positions generally require some form of licensure, although not necessarily a two-year degree. The positions are generally high paying, well above the livable wage. The overall supply of talent in the field outstrips demand for workers.

Knowledge Needed

- » Health: medicine, therapy and counseling
- » Math and Science: psychology and biology
- » Business: customer service

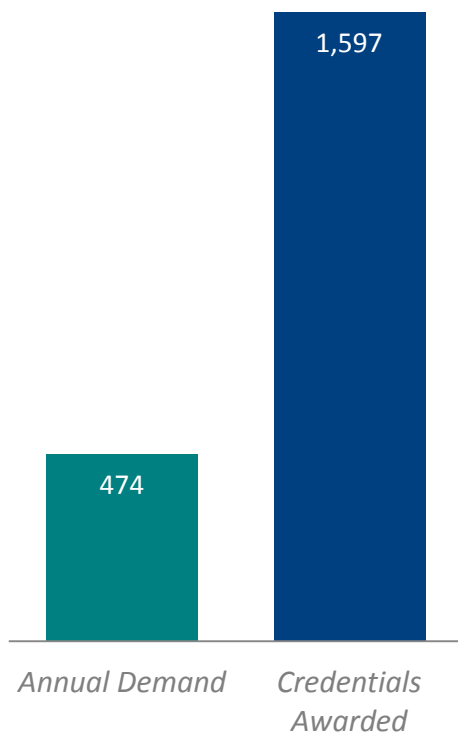
Technical Skills in Demand

- » Therapist Aide Licensure, Medical Software, Scheduling, Treatment Planning, Family Education

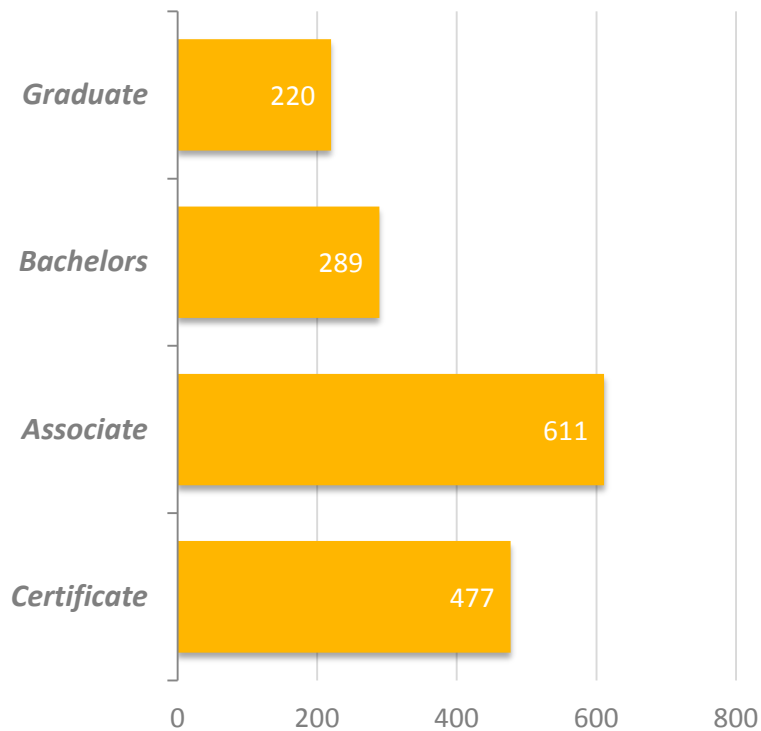
Top Employers Hiring

- » Kindred Healthcare Incorporated
- » Cleveland Clinic
- » HCR ManorCare
- » Southwest General Health Center
- » Parma Community General Hospital

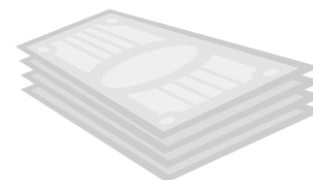
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$24.54

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Healthcare Therapist Aides and Support Workers	474	\$24.54	477	611	289	220

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Physical Therapist Assistants	156	\$27.74	14%	59%	27%
Occupational Therapy Assistants	135	\$27.34	5%	78%	16%
Occupational Health and Safety Specialists	85	\$34.28	13%	27%	60%
Athletic Trainers	39	\$21.08	13%	27%	60%
Healthcare Practitioners and Technical Workers, All Other	19	\$14.02	NA	NA	NA

NA = Data not available due to variances among “other” occupations included.

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Nursing and Home Health Aides: Overview

Description

Nursing and Home Health Aides work in community-based care, social service, institutional and hospital settings.

Workers in this occupation provide routine individualized health care under the direction of nursing supervisor such as changing bandages and dressing wounds, and applying topical medications to the elderly, convalescents, or persons with disabilities; maintain records of patient care, condition, progress, or problems to report and discuss observations with supervisor or case manager.

The positions generally require some form of licensure after high school, although not necessarily a two-year degree. The positions are generally low paying.

Knowledge Needed

- » Health: medical terminology and basic patient care
- » Math and Science: psychology and biology
- » Business: customer service

Technical Skills in Demand

- » Certified Nursing Aide Licensure, Patient Care, Life Support, Vital Signs Measurement

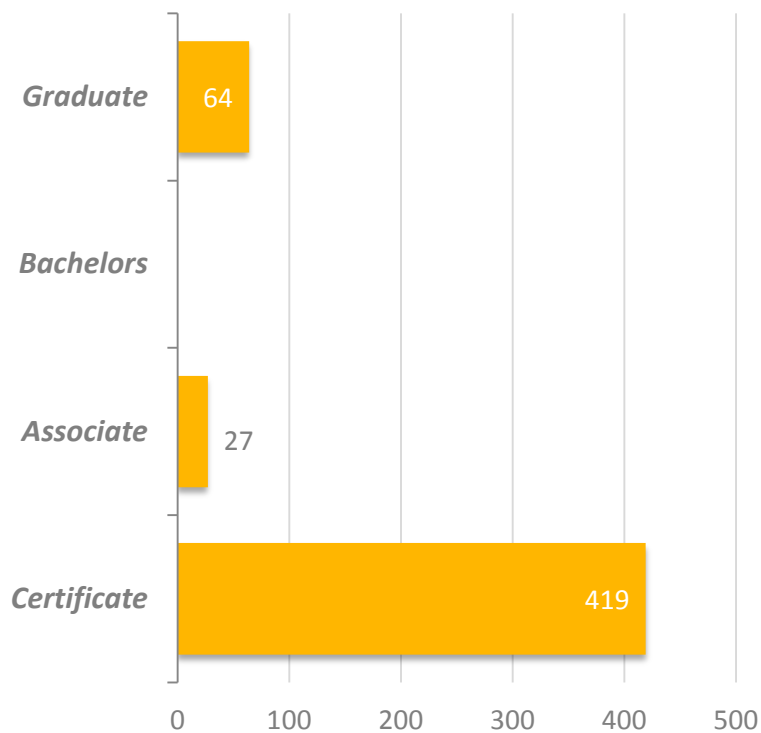
Top Employers Hiring

- » Southwest General Health Center
- » Cleveland Clinic
- » Ohio Presbyterian Retirement Services
- » HCR ManorCare
- » Southwest General
- » Kindred Healthcare Incorporated

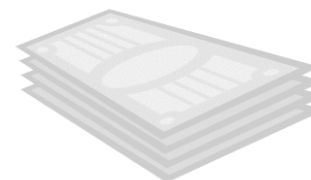
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$10.46

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Nursing and Home Health Aides	2,069	\$10.46	419	27	0	64

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Nursing Assistants	1,089	\$11.72	51%	42%	8%
Home Health Aides	888	\$9.29	51%	42%	8%
Orderlies	75	\$11.70	51%	42%	8%
Psychiatric Aides	18	\$15.02	51%	42%	8%

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Engineers: Overview

Description

Engineers primarily work in manufacturing and professional, scientific, and technical service industries.

Workers in this occupation perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment; design, develop, or test components and systems for commercial, industrial, military, or scientific use.

Most positions require a four-year degree, a next step up from engineering technicians.

Knowledge Needed

- » Engineering and Technology: electronics and computers
- » Math and Science: physics, arithmetic, algebra, geometry, calculus, or statistics
- » Product Design and Service Development
- » Goods Manufacturing: manufacture and distribution of products

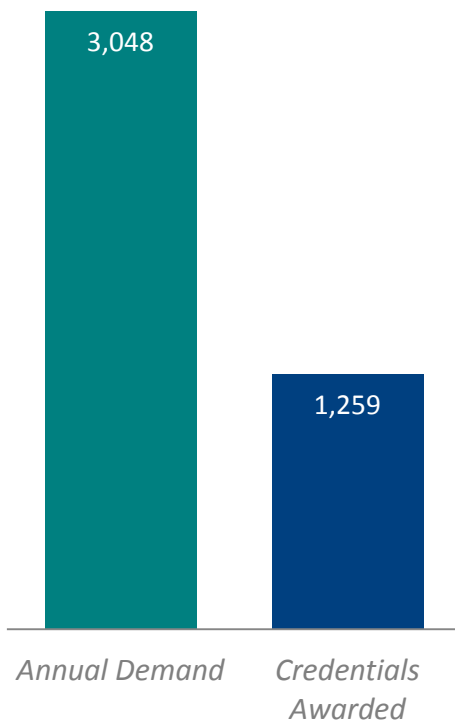
Technical Skills in Demand

- » Computer Aided Drafting/Design (CAD), Product Design and Manufacturing Processes, Mechanical Engineering and Electrical Engineering

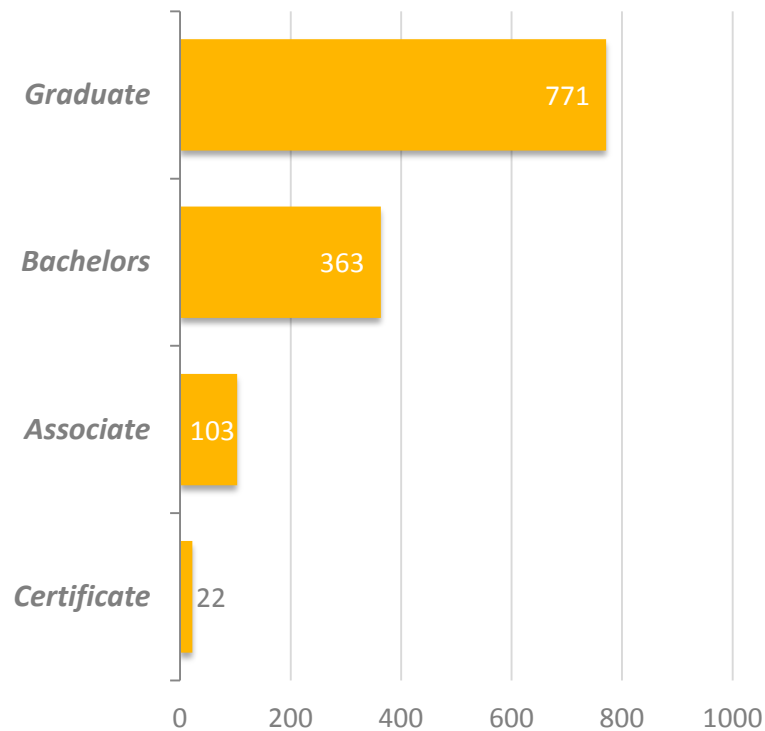
Top Employers Hiring

- » Rockwell Automation Incorporated
- » URS Corporation
- » The Babcock & Wilcox Company
- » The Lubrizol Corporation
- » Bendix Commercial Vehicle Systems

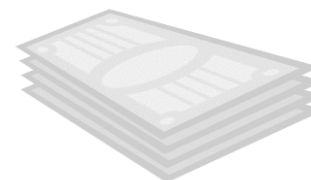
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$38.83

County Livable Wage
\$17.62

Engineers: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Engineers	3,048	\$38.83	22	103	363	771

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Mechanical Engineers	675	\$34.86	4%	24%	71%
Civil Engineers	535	\$33.49	4%	13%	83%
Electrical Engineers	488	\$38.42	3%	19%	77%
Engineers, All Other	388	\$43.41	3%	15%	82%
Industrial Engineers	302	\$37.06	6%	22%	73%
Chemical Engineers	251	\$40.88	2%	10%	88%
Electronics Engineers, Except Computer	66	\$38.23	3%	19%	77%

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Description

Architects and Engineering Technicians work in manufacturing and professional and technical services companies. The occupations are relatively well paid and require some type of postsecondary credential. The group offers opportunities for two-year degreed positions that often work in support or under direction of higher level engineers and architects.

Workers in this occupation design, diagnose, test, or analyze the performance of components, assemblies, or systems; prepare detailed drawings of architectural and structural features of buildings or drawings and topographical relief maps used in civil engineering projects.

Knowledge Needed

- » Engineering and Technology: computers and electronics, mechanical and design
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics, physics
- » Manufactured Goods: manufacture and distribution of products

Technical Skills in Demand

- » Test Equipment and Inspection, Wiring, Soldering, Machinery, Schematic Diagrams, Programmable Logic Controller (PLC) Programming

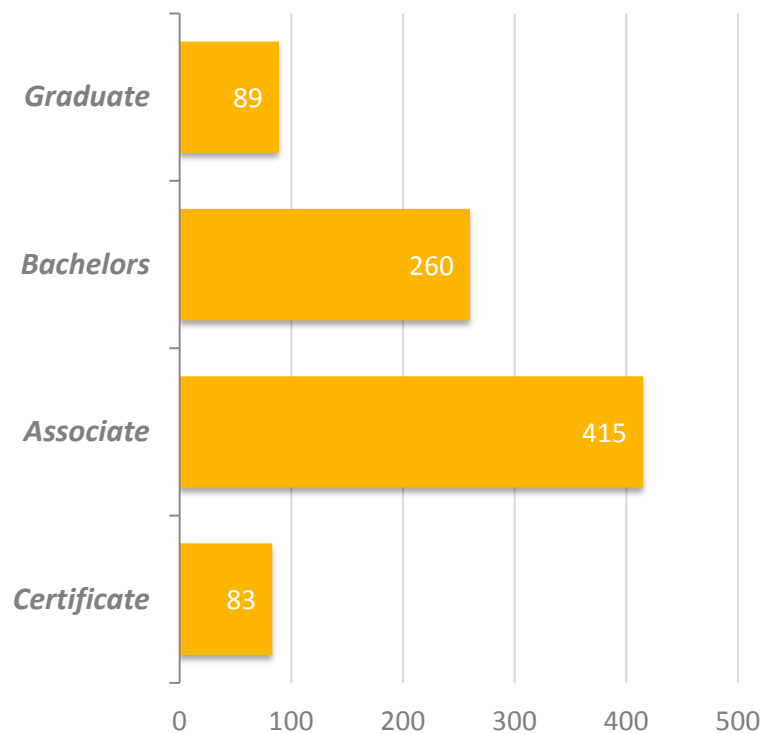
Top Employers Hiring

- » Middough Inc
- » State Of Ohio
- » Parker Hannifin
- » Cleveland Clinic and Summa Health System
- » URS Corporation

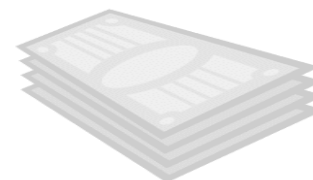
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$24.83

County Livable Wage
\$17.62

Architects and Engineering Technicians: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Architects and Engineering Technicians	904	\$24.83	83	415	260	89

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Mechanical Drafters	167	\$22.38	16%	56%	27%
Electrical and Electronics Engineering Technicians	143	\$26.01	27%	56%	17%
Engineering Technicians, All Other	107	\$30.08	NA	NA	NA
Architects	106	\$28.28	2%	11%	87%
Drafters, General	82	\$22.18	16%	56%	27%
Mechanical Engineering Technicians	63	\$24.39	27%	56%	17%
Electrical and Electronics Drafters	52	\$20.64	16%	56%	27%

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Life and Physical Science Workers: Overview

Description

Life and Physical Science Workers are employed in health care, biomedical, and education settings. There is a high level of production of credentials that feeds demand.

Workers in this occupation engage in clinical investigation, research and development; conduct research or assist in research, analyze experimental data and interpret results to write reports and summaries of findings, keep detailed logs of all work-related activities and use computers, computer-interfaced equipment, robotics or high-technology industrial applications to perform work duties.

Life sciences occupations typically deal with highly regulated protocols that require at least a two-year degree and often a Bachelor's Degree. The technician level occupation typically has an entry-level requirement of a two-year degree.

Knowledge Needed

- » Health: medicine
- » Math and Science: biology, chemistry, physics, arithmetic, algebra, geometry, calculus, or statistics

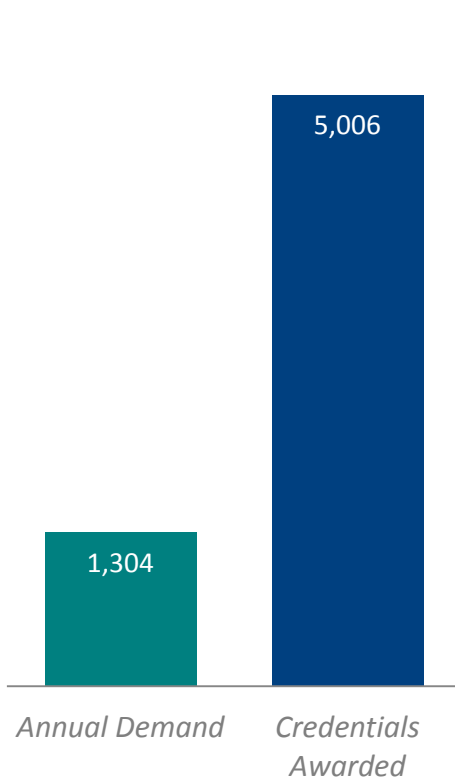
Technical Skills in Demand

- » Process Improvement, Clinical Research and IRB protocols, Medical and Laboratory Information Systems

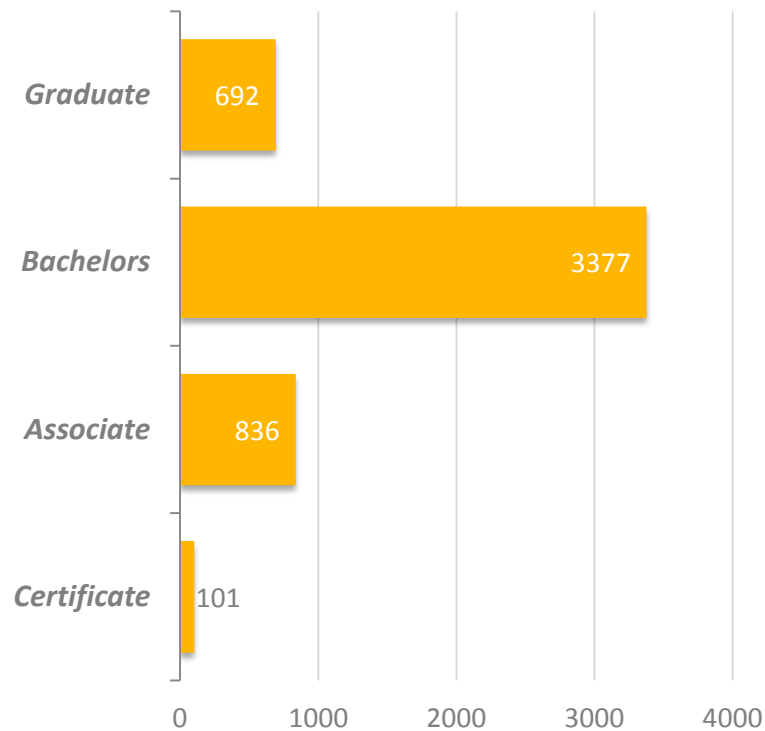
Top Employers Hiring

- » Cleveland Clinic
- » The Lubrizol Corporation
- » Case Western Reserve University
- » Sherwin Williams
- » PPG Industries

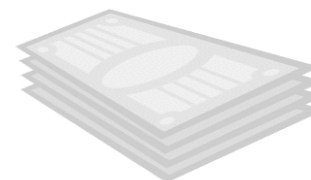
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$29.99

County Livable Wage
\$17.62

Life and Physical Science Workers: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Life and Physical Science Workers	1,304	\$29.99	101	836	3,377	692

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Chemists	271	\$29.51	0%	8%	92%
Medical Scientists	225	\$32.53	0%	16%	84%
Life, Physical, and Social Science Technicians	164	\$22.75	17%	37%	46%
Clinical, Counseling, Psychologists	98	\$35.95	0%	1%	99%
Biological Technicians	82	\$16.52	23%	32%	45%
Agricultural and Food Science Technicians	55	\$22.37	36%	39%	25%
Chemical Technicians	33	\$20.04	27%	42%	30%

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Financial Specialists: Overview

Description

Financial Specialists work in the financial services industry, business support and back office employers, and in the administrative departments across sectors.

Workers in this occupation assist with, compile, and analyze financial information and prepare financial reports to determine or maintain record of assets, liabilities, profit and loss, tax liability, or other financial activities within an organization; review degree of financial risk; assess credit, corporate financial statements, and other financial information.

The occupational area has many high-wage positions that require four-year degrees and beyond. There are also opportunities in analyst positions, like loan officers, underwriters, and credit analysts, that could be a next step in a career ladder for lower-level financial clerks.

Knowledge Needed

- » Engineering and Technology: computers
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics
- » Business: administrative and customer service, accounting and economics

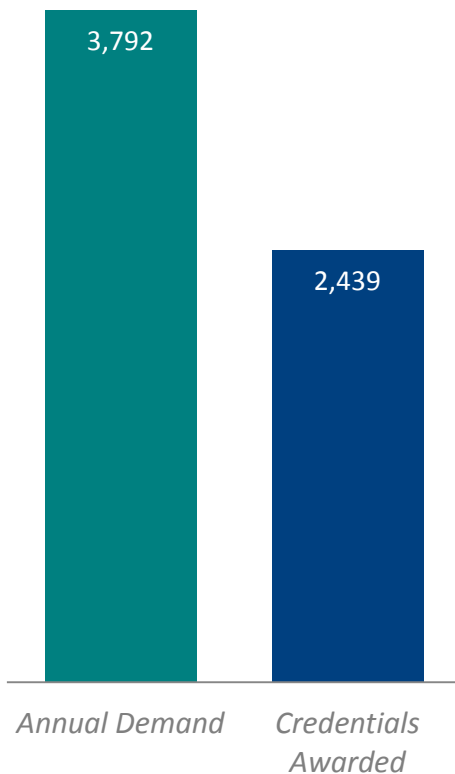
Technical Skills in Demand

- » Accounting and Financial Analysis, Financial Reporting and Financial Statements, Account Reconciliation, SAP

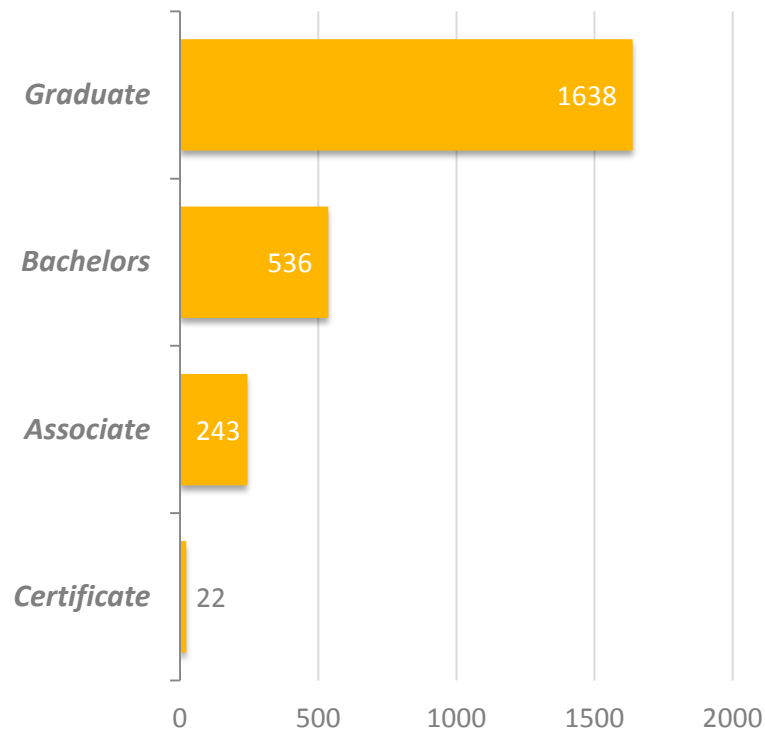
Top Employers Hiring

- » Cleveland Clinic
- » Keycorp
- » The PNC Financial Services Group, Inc.
- » Citizens Financial Group
- » JP Morgan Chase Company

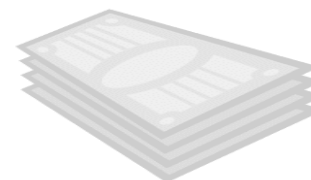
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$29.29

County Livable Wage
\$17.62

Financial Specialists: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Financial Specialists	3,792	\$29.29	22	243	536	1,638

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Accountants and Auditors	1,854	\$29.69	4%	19%	77%
Financial Analysts	652	\$34.34	3%	10%	86%
Personal Financial Advisors	541	\$30.47	4%	16%	79%
Loan Officers	323	\$27.41	15%	38%	47%
Insurance Underwriters	106	\$28.34	15%	33%	53%
Financial Specialists, All Other	93	\$31.02	12%	29%	59%
Credit Analysts	75	\$29.58	9%	28%	63%

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Financial Clerks: Overview

Description

Financial Clerks work in the financial services industry, among business support and back office employers, and in administrative departments across sectors.

Workers in this occupation compute, classify, and record numerical data to keep financial records complete; perform calculating, posting, and verifying duties to obtain primary financial data for use in maintaining financial records.

Most occupations in the group require less than a four-year degree, but some postsecondary credential. The wages are relatively low, but two years of experience with industry-related credentialing can allow movement to higher paid positions in financial services (e.g. financial analysts, accounting).

Knowledge Needed

- » Engineering and Technology: computers
- » Math and Science: arithmetic, algebra, geometry, calculus, or statistics
- » Business: administrative services, accounting and economics

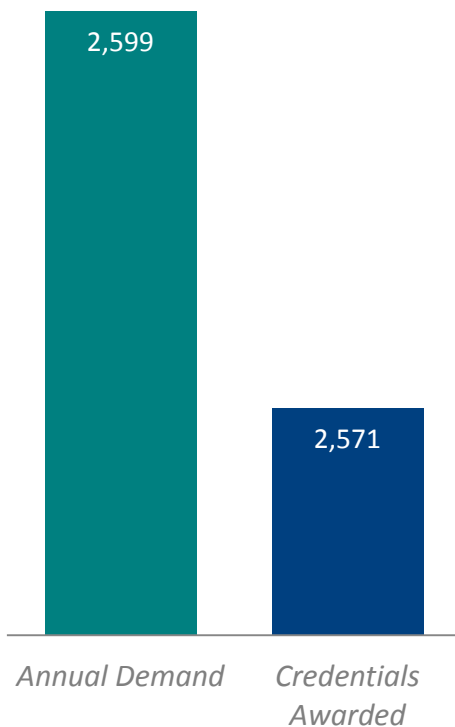
Technical Skills in Demand

- » Financial Analysis, Compliance and Financial Software, Accounting, Bookkeeping, QuickBooks

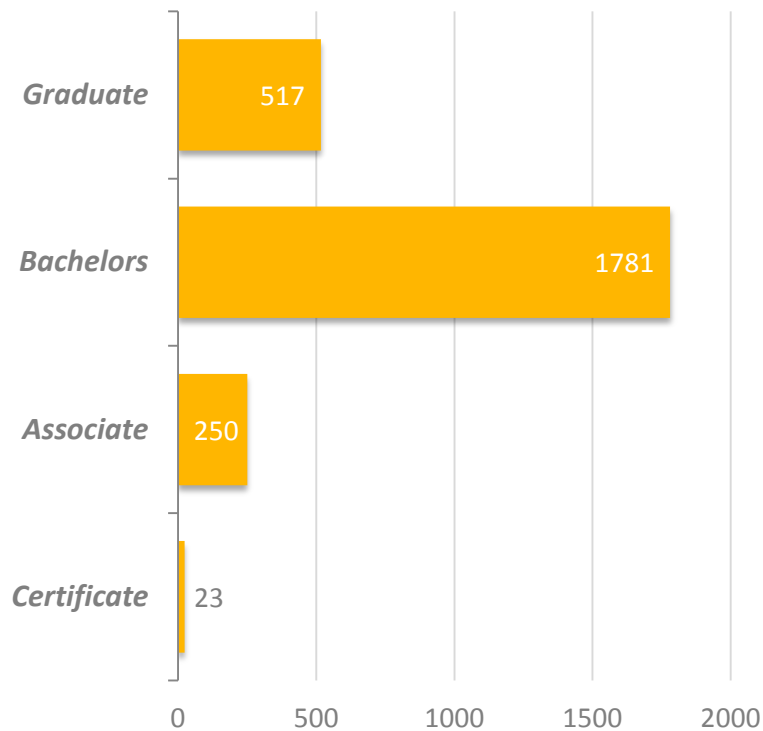
Top Employers Hiring

- » The PNC Financial Services Group, Inc.
- » Firstmerit
- » Keycorp
- » Citizens Financial Group
- » U.S. Bancorp

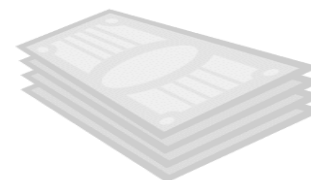
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$16.04

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Financial Clerks	2,599	\$16.04	23	250	1,781	517

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Bookkeeping, Accounting, and Auditing Clerks	1,069	\$17.03	34%	50%	16%
Tellers	692	\$11.80	34%	50%	16%
Bill and Account Collectors	290	\$15.11	36%	49%	15%
Billing and Posting Clerks	254	\$16.18	35%	49%	16%
Payroll and Timekeeping Clerks	204	\$18.98	30%	51%	18%
Procurement Clerks	71	\$17.41	27%	48%	25%

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Secretaries and Administrative Assistants: Overview

Description

Secretaries and Administrative Assistants work in a variety of industries, from education to manufacturing to professional and business services to health care. There are four main occupations within this group: general secretaries and administrative assistants, medical secretaries, executive assistants, and legal secretaries.

Workers in this occupation perform clerical and administrative functions, at times specialized to the industry, such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to clients.

Most new workers entering this occupation have some postsecondary training or credential, with legal and medical secretaries requiring increasingly specialized training.

Knowledge Needed

- » Business: administrative and customer service
- » Technology: computers
- » Arts and Humanities: writing and language

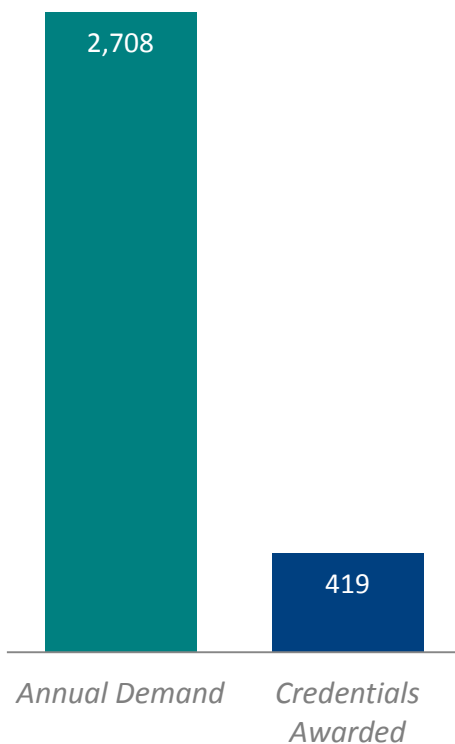
Technical Skills in Demand

- » Database User Interface and Queries, Office Software, Specialized Software Applications

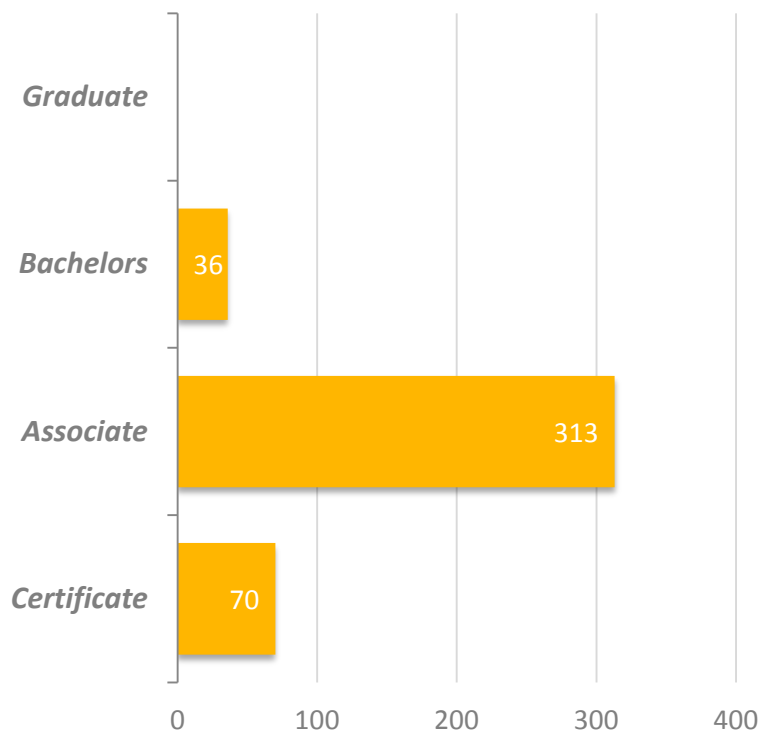
Top Employers Hiring

- » Cleveland Clinic
- » University Hospitals
- » Southwest General Health Center
- » Akron Childrens Hospital
- » Case Western Reserve University

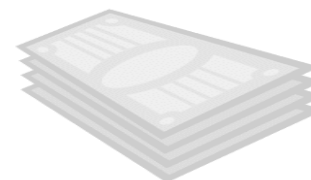
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$17.01

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Secretaries and Administrative Assistants	2,708	\$17.01	70	313	36	0

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Secretaries and Administrative Assistants	1,662	\$15.71	33%	49%	19%
Medical Secretaries	559	\$15.17	33%	49%	19%
Executive Secretaries and Executive Assistants	339	\$21.67	33%	49%	19%
Legal Secretaries	150	\$20.04	33%	49%	19%

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Description

Information and Record Clerks work in a variety of industries, some of which are tied to the growth and wealth-driving sectors (such as business services and back office support) and some of which are more closely aligned to retail and hospitality (e.g. hotel clerks).

Workers in this occupation interact with customers to provide information in response to inquiries about products and services.

The wages in this occupational group are relatively low and career opportunities are limited unless there is movement to supervisory or management positions. About half of the positions in this occupational area require some form of postsecondary credential.

Knowledge Needed

- » Business: administrative and customer service
- » Technology: computers
- » Arts and Humanities: writing and language

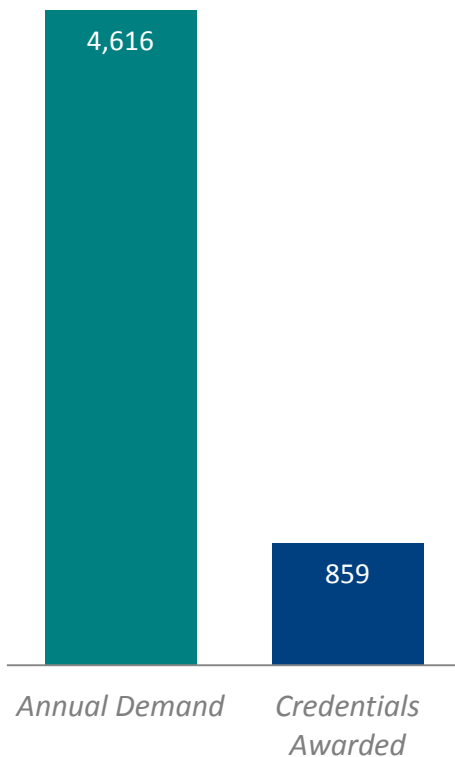
Technical Skills in Demand

- » Database User Interface and Queries, Office Software, Customer Relationship Management (CRM) Software, Scheduling, Data Entry

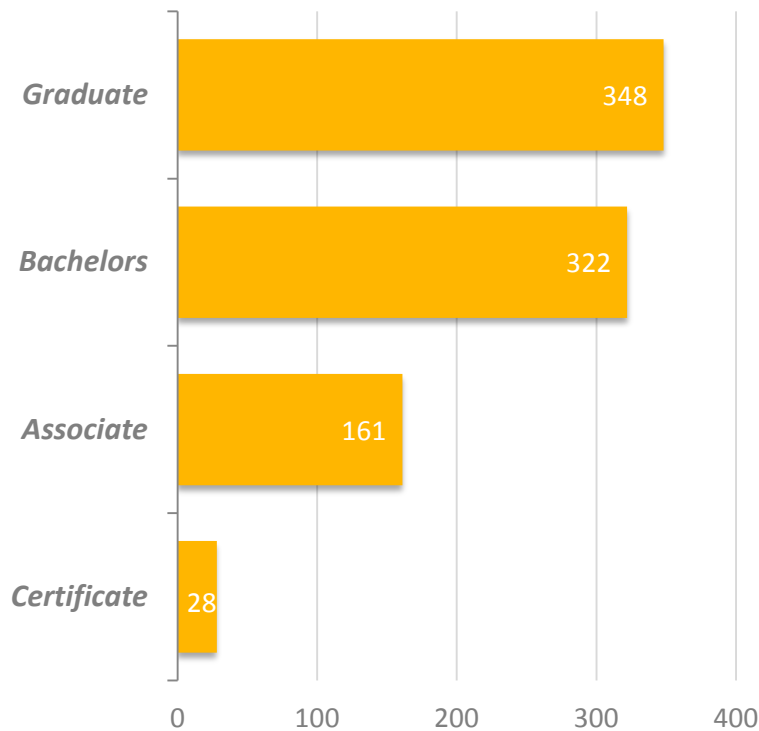
Top Employers Hiring

- » Cleveland Clinic
- » Akron Childrens Hospital
- » Fifth Third Bank
- » Infocision Management
- » JC Penney

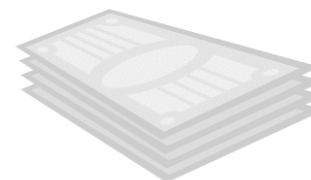
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$15.20

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Information and Record Clerks	4,616	\$15.20	28	161	322	348

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Customer Service Representatives	2,970	\$15.88	35%	46%	19%
Receptionists and Information Clerks	553	\$12.23	39%	48%	13%
Hotel, Motel, and Resort Desk Clerks	266	\$9.26	37%	48%	15%
Interviewers, Except Eligibility and Loan	173	\$15.32	26%	46%	28%
Human Resources Assistants	157	\$18.98	24%	49%	27%
Loan Interviewers and Clerks	83	\$17.19	30%	49%	21%

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First-line Supervisors of Skilled Workers: Overview

Description

First-line Supervisors manage skilled production, construction, and front-line office workers in a number of settings (manufacturing, construction, office and business support).

Workers in this occupation directly supervise and coordinate activities of workers; read specifications, such as blueprints or project work plans, to determine tasks; inspect work progress, equipment, or work site or work team to ensure that specifications are met.

Supervisors often progress in their positions through experience, rather than formal education. Management and business programs are large feeders of talent in the pipeline. Area educational institutions produce more talent supply for these positions than there is demand in the economy.

Knowledge Needed

- » Engineering and Technology: buildings, mechanical
- » Math and Science: basic arithmetic, algebra, and geometry
- » Business: management and human resources
- » Education and Training

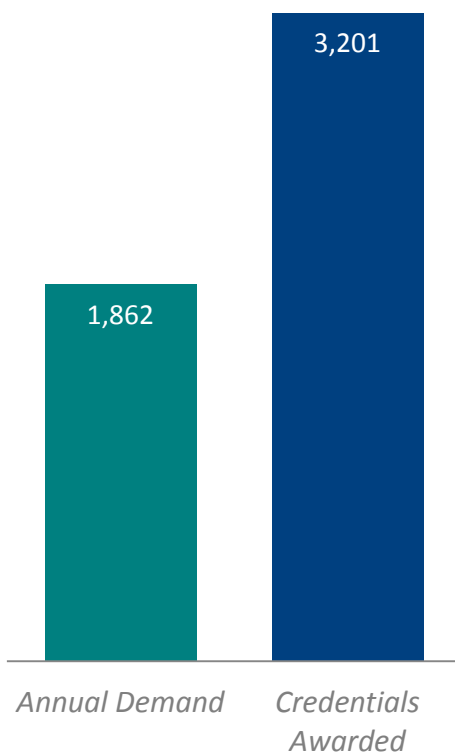
Technical Skills in Demand

- » Project Management Software, Calendar and Scheduling Software, Enterprise Resource Planning (ERP), SAP, Process Improvement

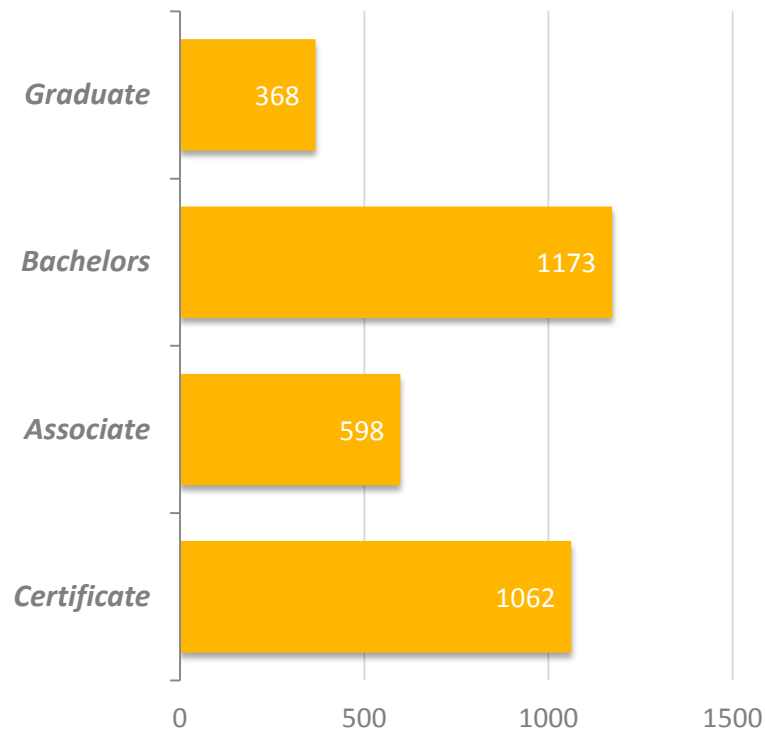
Top Employers Hiring

- » Cleveland Clinic
- » Monro Muffler Brake
- » Nestle USA Incorporated
- » U.S. Bancorp
- » Produce Packaging Incorporated

DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE



First-line Supervisors of Skilled Workers: Data Breakdown

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All First-line Supervisors of Skilled Workers	1,862	\$25.12	1062	598	1173	368

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or higher</i>
Supervisors of Office and Administrative Support Workers	875	\$23.18	27%	43%	30%
Supervisors of Production and Operating Workers	598	\$26.23	51%	34%	15%
Supervisors of Mechanics, Installers, and Repairers	313	\$28.42	40%	46%	13%
Supervisors of Construction Trades and Extraction Workers	76	\$25.06	57%	31%	11%

**The “Occupational Group” in the first table is a 3-digit occupational group as categorized by the Standard Occupational Classification (SOC) system. The “Key Occupations Within Group” in the second table is a sub-set of occupations within this group, identified by the SOC system as 6-digit occupations. Key occupations listed in the second table are selected to show those 6-digit occupations within the group with the greatest demand and do not include all occupations within the group.*

Description

Management level positions are found in all industries and include medical and health managers, food service managers, construction managers, education administrators, and architecture and engineering managers.

In general, management level workers conduct and administer fiscal operations; direct, supervise and evaluate staff and work activities in professional and technical areas; manage and maintain communication between staff and department heads and coordinate interdepartmental functioning.

Knowledge Needed

- » Business: management and human resources
- » Education and Training
- » Math and Science: basic arithmetic and algebra

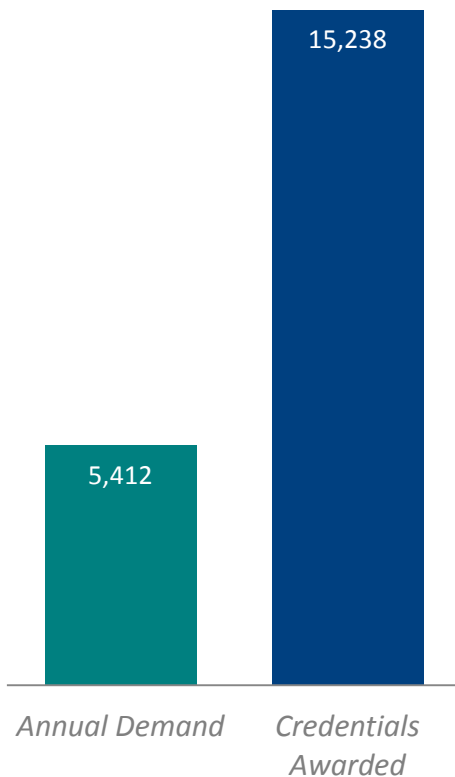
Technical Skills in Demand

- » Project Management Software, Calendar and Scheduling Software, Scheduling, Accounting, Enterprise Resource Planning (ERP)

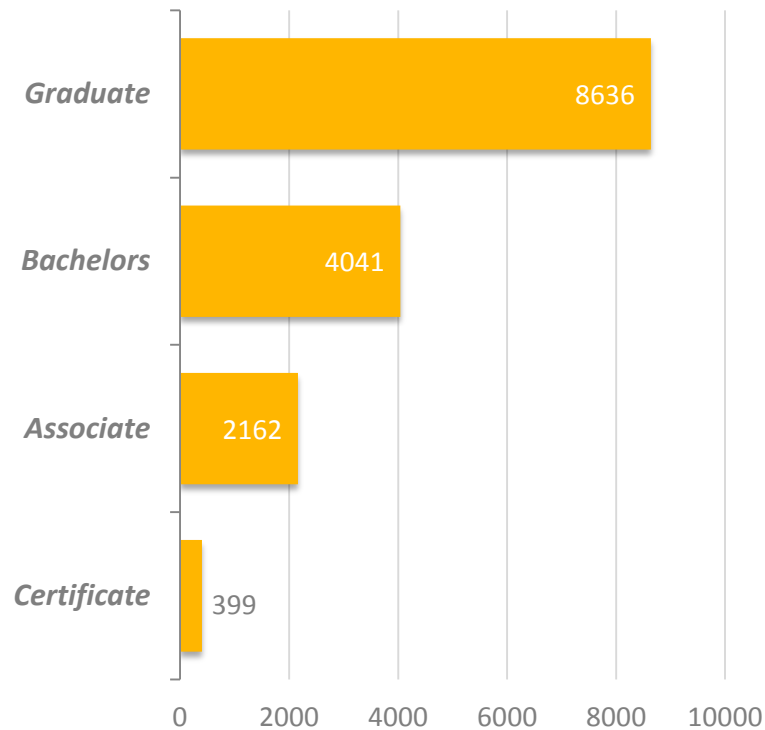
Top Employers Hiring

- » Cleveland Clinic
- » Pizza Hut
- » Taco Bell
- » HCR ManorCare
- » Kindred Healthcare Incorporated
- » Akron Childrens Hospital
- » Lutheran Hospital

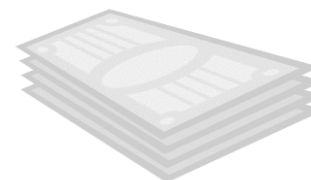
DEMAND & SUPPLY



CREDENTIALS AWARDED



MEDIAN HOURLY WAGE

\$31.24

County Livable Wage
\$17.62

OCCUPATIONAL GROUP (3-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS AWARDED			
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>Certificate</i>	<i>Associate</i>	<i>Bachelors</i>	<i>Graduate</i>
All Management, Professional and Health	5,412	\$31.24	399	2,162	4,041	8,636

KEY OCCUPATIONS WITHIN GROUP (6-DIGIT SOC)*	LABOR MARKET DEMAND		CREDENTIALS REQUIRED		
	<i>Annual Demand</i>	<i>Median Hourly Wage</i>	<i>HS or less</i>	<i>Some College or Associate</i>	<i>Bachelor or Higher</i>
Medical and Health Services Managers	1,882	\$41.96	12%	30%	58%
Managers, All Other	1,214	\$33.31	19%	29%	52%
Food Service Managers	821	\$18.55	41%	38%	21%
Education Administrators, Postsecondary	265	\$40.53	7%	15%	78%
Architectural and Engineering Managers	261	\$56.36	4%	14%	82%
Construction Managers	236	\$27.83	34%	34%	31%

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