



Education Report

Civil Engineering, General

California



Definition of Civil Engineering, General, CIP 14.0801 3
Awards..... 4
Occupation Crosswalk 5
Occupation Details 6
Employment by Industry 7
Geographic Distribution 8
Demographic Profile..... 9
RTI (Job Postings) 10
California Regional Map 15
FAQ..... 16

Definition of Civil Engineering, General, CIP 14.0801

A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of structural, load-bearing, material moving, transportation, water resource, and material control systems; and environmental safety measures.

Awards

The table below is a list of postsecondary awards in CIP 14.0801 that were granted by institutions located in California in the 2021 academic year.

Schools	Certs & 2yr Awards ¹	4yr Awards ²	Post-Grad Awards ³	Avg Net Price ⁴
University of California-Berkeley		89	205	\$17,652
California State Polytechnic University-Pomona		245	23	\$12,942
University of California-Davis		150	78	\$16,640
California State University-Sacramento		162	17	\$7,778
Stanford University		7	169	\$14,402
California Polytechnic State University-San Luis Obispo		172		\$20,708
California State University-Long Beach		147	24	\$9,171
San Jose State University		124	45	\$14,603
San Diego State University		137	25	\$6,867
California State University-Fullerton		116	45	\$4,939
University of California-Los Angeles		70	85	\$13,393
University of California-Irvine		91	51	\$11,633
California State University-Fresno		82	20	\$6,336
California State University-Northridge		99		\$8,708
California State University-Los Angeles		89	6	\$2,695
California State University-Chico		78		\$13,749
San Francisco State University		70		\$13,641
California Baptist University		37	4	\$23,494
Loyola Marymount University		26	9	\$40,180
University of Southern California		14	12	\$26,021
Santa Clara University		19	5	\$48,469
University of the Pacific		18		\$21,311
California Institute of Technology			2	\$30,162
Total	0	2,042	825	

1. Undergraduate certificates and associate's degrees

2. Bachelor's degrees and post-baccalaureates

3. Master's, post-master's, and doctorates

4. Average net price represents full-time beginning undergraduate students who paid the in-state or in-district tuition rate and were awarded grant or scholarship aid from federal, state or local governments, or the institution. Data as of the 2020-2021 academic year.

Awards data are per the National Center for Education Statistics (NCES) and JobsEQ for the 2021 academic year. Any programs shown here reflect only data reported to the NCES; reporting is required of all schools participating in any federal finance assistance program authorized by Title IV of the Higher Education Act of 1965, as amended—other training providers in the region that do not report data to the NCES are not reflected in the above.

Occupation Crosswalk

The below table lists all occupations linked with the program, Civil Engineering, General, CIP 14.0801.

		Education and Training Requirements			Educational Attainment				
		Typical Education Needed for Entry	Work Experience in a Related Occupation	Typical On-the-Job Training Needed to Attain Competency in the Occupation	No College	Some College, No Degree	Associate's Degree	Bachelor's Degree	Postgraduate Degree
11-9041	Architectural and Engineering Managers	Bachelor's degree	5 years or more	None	2%	3%	3%	48%	43%
17-2051	Civil Engineers	Bachelor's degree	None	None	2%	3%	3%	59%	33%
25-1032	Engineering Teachers, Postsecondary	Doctoral or professional degree	None	None	1%	1%	1%	14%	83%

Education and training requirements are from the Bureau of Labor Statistics (BLS); educational attainment mix are regional data modeled by Chmura using Census educational attainment data projected to 2022Q4 along with source data from the BLS

Definition of Architectural and Engineering Managers (11-9041)

Plan, direct, or coordinate activities in such fields as architecture and engineering or research and development in these fields.

Definition of Civil Engineers (17-2051)

Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems.

Definition of Engineering Teachers, Postsecondary (25-1032)

Teach courses pertaining to the application of physical laws and principles of engineering for the development of machines, materials, instruments, processes, and services. Includes teachers of subjects such as chemical, civil, electrical, industrial, mechanical, mineral, and petroleum engineering. Includes both teachers primarily engaged in teaching and those who do a combination of teaching and research.

Occupation Details

As of 2022Q4, total employment for occupations linked to Civil Engineering, General in California was 81,899. Over the past three years, linked occupations added 1,887 jobs in the region and are expected to need in aggregate approximately 43,358 newly trained workers over the next seven years.

Snapshot of Occupations Linked to Civil Engineering, General in California¹

SOC	Occupation	Current						3-Year History	7-Year Forecast				
		Empl	Mean Ann Wages ²	LQ	Unempl	Unempl Rate	Online Job Ads ³	Ann %	Total Demand	Exits	Transfers	Empl Growth	Avg Ann Growth %
17- 2051	Civil Engineers	45,030	\$116,100	1.17	804	1.8%	1,037	1.0%	23,954	7,147	14,619	2,188	0.7%
11- 9041	Architectural and Engineering Managers	34,713	\$195,500	1.47	348	1.0%	6,681	0.6%	17,919	4,921	12,304	694	0.3%
25- 1032	Engineering Teachers, Postsecondary	2,156	\$156,000	0.50	41	1.9%	173	-0.9%	1,485	713	602	171	1.1%
Total - Linked Occupations		81,899	\$150,800	1.23	1,193	1.5%	7,891	0.8%	43,358	12,781	27,524	3,053	0.5%
Total - All Occupations		19,219,968	\$71,900	1.00	797,161	4.1%	549,411	0.6%	17,029,863	6,722,656	9,379,252	927,955	0.7%

Source: [JobsEQ®](#)

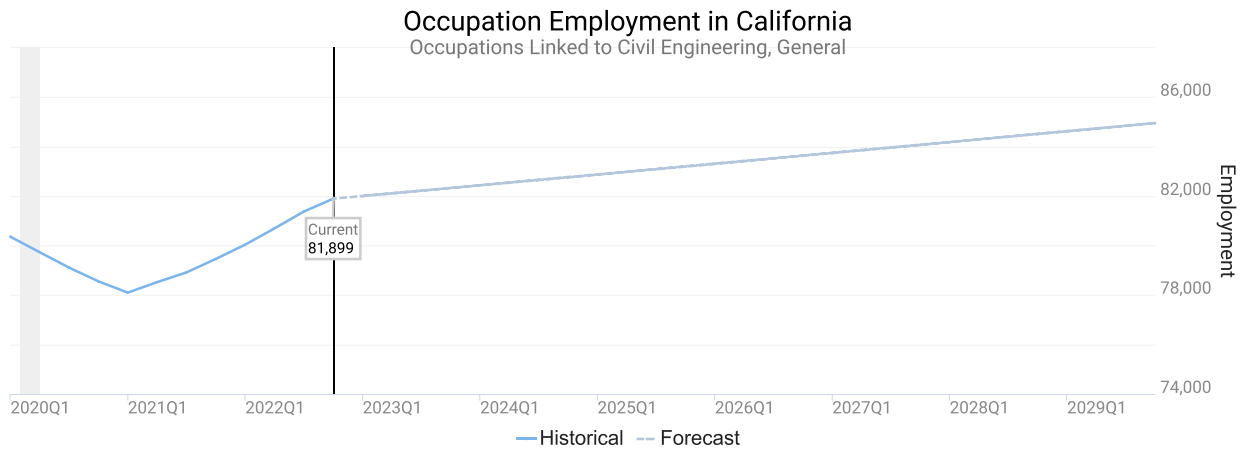
Data as of 2022Q4 unless noted otherwise

Note: Figures may not sum due to rounding.

1. Data based on a four-quarter moving average unless noted otherwise.

2. Wage data represent the average for all Covered Employment

3. Data represent found online ads active within the last thirty days in the selected region. Due to alternative county-assignment algorithms, ad counts in this analytic may not match that shown in RTI (nor in the popup window ad list). Ad counts for ZCTA-based regions are estimates.



Source: JobsEQ®. Data as of 2022Q4. The shaded areas of the graph represent national recessions.

Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2022Q3, imputed where necessary with preliminary estimates updated to 2022Q4. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns. Occupation unemployment figures are imputed by Chmura.

Employment by Industry

The table illustrates the industries in California which most employ occupations linked to Civil Engineering, General. The single industry most employing these occupations in the region is Architectural, Engineering, and Related Services, NAICS 5413. This industry employs 34,652 workers in the linked occupations—employment which is expected to increase by 2,144 jobs over the next ten years; furthermore, 24,120 additional new workers in these linked occupations will be needed for this industry due to separation demand, that is, to replace workers in this occupation and industry that retire or move into a different occupation.

Industry Distribution for Occupations Linked to Civil Engineering, General in California

NAICS Code	Industry Title	Current			10-Year Demand		
		% of Occ Empl	Empl	Exits	Transfers	Empl Growth	Total Demand
5413	Architectural, Engineering, and Related Services	42.3%	34,652	7,659	16,461	2,144	26,263
5417	Scientific Research and Development Services	4.7%	3,865	817	2,011	401	3,229
9221	Justice, Public Order, and Safety Activities	3.6%	2,950	654	1,378	146	2,178
2362	Nonresidential Building Construction	3.6%	2,931	650	1,345	96	2,092
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	3.4%	2,820	563	1,392	-39	1,916
9211	Executive, Legislative, and Other General Government Support	3.1%	2,522	563	1,183	154	1,900
3344	Semiconductor and Other Electronic Component Manufacturing	2.9%	2,365	481	1,198	75	1,753
6113	Colleges, Universities, and Professional Schools	2.5%	2,083	902	865	259	2,027
3364	Aerospace Product and Parts Manufacturing	2.5%	2,024	401	987	-65	1,323
3341	Computer and Peripheral Equipment Manufacturing	2.2%	1,839	373	933	60	1,367
9231	Administration of Human Resource Programs	2.2%	1,829	406	854	90	1,350
5511	Management of Companies and Enterprises	2.2%	1,761	364	870	45	1,279
5416	Management, Scientific, and Technical Consulting Services	1.7%	1,422	320	713	197	1,230
9261	Administration of Economic Programs	1.4%	1,182	259	543	21	823
5415	Computer Systems Design and Related Services	1.2%	973	213	517	162	892
9241	Administration of Environmental Quality Programs	1.1%	927	203	428	23	654
2373	Highway, Street, and Bridge Construction	0.9%	764	173	357	57	587
3391	Medical Equipment and Supplies Manufacturing	0.8%	692	144	359	55	558
5613	Employment Services	0.8%	676	149	320	40	509
2212	Natural Gas Distribution	0.8%	674	140	315	-15	441
	All Others	15.8%	12,947	2,830	6,304	495	9,629

Source: JobsEQ®

Data as of 2022Q4 except wages which are as of 2021. Note that occupation-by-industry wages represent adjusted national data and may not be consistent with regional, all-industry occupation wages shown elsewhere in JobsEQ.

Note: Figures may not sum due to rounding.

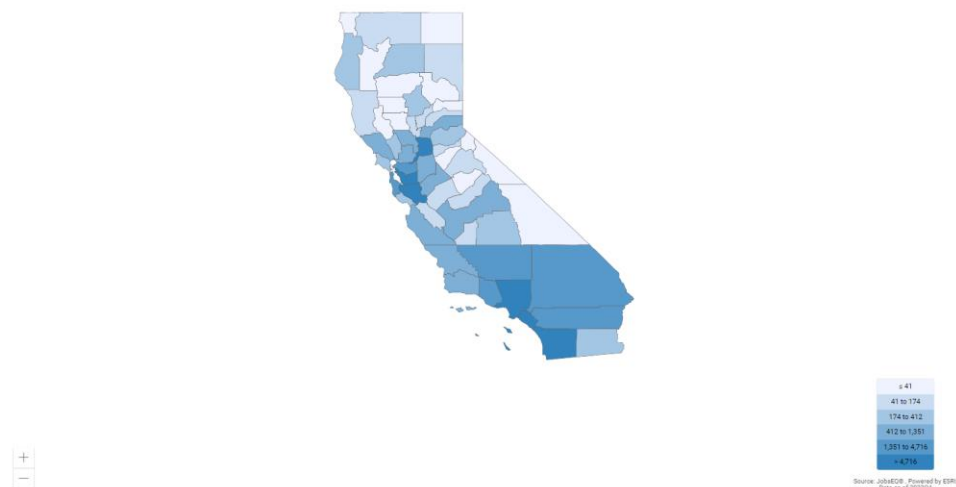
Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2022Q3, imputed where necessary with preliminary estimates updated to 2022Q4. Forecast employment growth uses national projections from the Bureau of Labor Statistics adapted for regional growth patterns.

Geographic Distribution

The map below illustrates the county-level distribution of employed workers in California in occupations linked to Civil Engineering, General. Employment is shown by place of work.

California, Occupation Concentration by Place of Work for Occupations Linked to Civil Engineering, General

export



Top Counties with Employment Linked to Civil Engineering, General, 2022Q4

Region	Employment
Los Angeles County, California	15,279
San Diego County, California	10,365
Orange County, California	9,306
Santa Clara County, California	9,270
Alameda County, California	4,752
Sacramento County, California	4,717
San Francisco County, California	3,823
San Bernardino County, California	2,531
Riverside County, California	2,271
Contra Costa County, California	1,990

Source: JobsEQ®

Occupation employment data are estimated via industry employment data and the industry/occupation mix. Industry employment data are derived from the Quarterly Census of Employment and Wages, provided by the Bureau of Labor Statistics and currently updated through 2022Q3, imputed where necessary with preliminary estimates updated to 2022Q4.

Demographic Profile

The population in California was 39,346,023 per American Community Survey data for 2016-2020.

Of individuals 25 to 64 in California, 35.4% have a bachelor's degree or higher which compares with 34.3% in the nation. Per American Community Survey 2016-2020 estimates, the region has about 576,714 students enrolled in grade 12.

Summary¹

	Percent		Value	
	California	USA	California	USA
Demographics				
Population (ACS)	—	—	39,346,023	326,569,308
Male	49.7%	49.2%	19,562,882	160,818,530
Female	50.3%	50.8%	19,783,141	165,750,778
Median Age ²	—	—	36.7	38.2
Under 18 Years	22.8%	22.4%	8,956,641	73,296,738
18 to 24 Years	9.5%	9.3%	3,724,239	30,435,736
25 to 34 Years	15.3%	13.9%	6,007,913	45,485,165
35 to 44 Years	13.3%	12.7%	5,233,903	41,346,677
45 to 54 Years	12.8%	12.7%	5,039,155	41,540,736
55 to 64 Years	12.0%	12.9%	4,739,675	42,101,439
65 to 74 Years	8.3%	9.4%	3,270,380	30,547,950
Population Growth				
Population (Pop Estimates) ⁴	—	—	39,029,342	333,287,557
Population Annual Average Growth ⁴	0.3%	0.6%	108,479	1,940,990
People per Square Mile	—	—	250.4	94.3
Educational Attainment, Age 25-64				
No High School Diploma	15.2%	10.5%	3,199,850	17,929,220
High School Graduate	20.4%	25.4%	4,282,776	43,289,555
Some College, No Degree	21.0%	20.5%	4,412,172	34,959,338
Associate's Degree	8.0%	9.3%	1,678,082	15,776,790
Bachelor's Degree	22.6%	21.6%	4,741,354	36,888,244
Postgraduate Degree	12.9%	12.7%	2,706,412	21,630,870
Social				
Poverty Level (of all people)	12.6%	12.8%	4,853,434	40,910,326
Households Receiving Food Stamps/SNAP	9.0%	11.4%	1,183,873	13,892,407
Enrolled in Grade 12 (% of total population)	1.5%	1.3%	576,714	4,358,865
Disconnected Youth ³	1.9%	2.5%	38,451	433,164
Children in Single Parent Families (% of all children)	32.8%	34.0%	2,796,858	23,628,508
Uninsured	7.2%	8.7%	2,806,173	28,058,903
Speak English Less Than Very Well (population 5 yrs and over)	17.4%	8.2%	6,432,102	25,312,024

Source: [JobsEQ®](https://www.chmuraecon.com/jobseq)

1. American Community Survey 2016-2020, unless noted otherwise

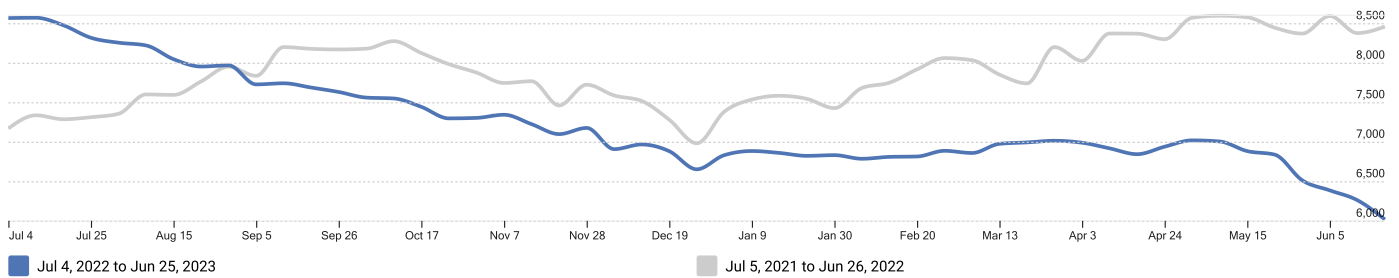
2. Median values for certain aggregate regions (such as MSAs) may be estimated as the weighted averages of the median values from the composing counties.

3. Disconnected Youth are 16-19 year olds who are (1) not in school, (2) not high school graduates, and (3) either unemployed or not in the labor force.

4. Census Population Estimate for 2022, annual average growth rate since 2012. Post-2019 data for Connecticut counties are imputed by Chmura.

RTI (Job Postings)

Active Job Ads by Date



Occupations

SOC	Occupation	Active Job Ads
11- 9041.00	Architectural and Engineering Managers	36,132
17- 2051.00	Civil Engineers	2,898
17- 2051.02	Water/Wastewater Engineers	596
25- 1032.00	Engineering Teachers, Postsecondary	592
17- 2051.01	Transportation Engineers	523

Locations

Location	Active Job Ads
San Diego, California	2,022
Los Angeles, California	1,670
San Francisco, California	1,531
Irvine, California	1,103
Palmdale, California	1,051
San Jose, California	985
Sacramento, California	880
Sunnyvale, California	844
Santa Clara, California	504
Fremont, California	496

Employers

Employer Name	Active Job Ads	
NORTHROP GRUMMAN	2,472	
LOCKHEED MARTIN	1,113	
Jobot	918	
Boeing	882	
Cybercoders	812	
Apple	763	
gpac	554	
General Atomics Aeronautical Systems	388	
Raytheon Technologies	376	
Jacobs	338	

Certifications

Certificate Name	Active Job Ads	
Secret Clearance	2,049	
Project Management Professional (PMP)	1,418	
Licensed Professional Engineer	1,106	
Engineer in Training (EIT)	792	
Driver's License	764	
Certified Construction Manager (CCM)	188	
Certified Quality Engineer (CQE)	128	
Six Sigma Green Belt Certification (SSGB)	86	
LEED Accredited Professional (not specified)	75	
Certified Associate in Project Management (CAPM)	51	

Hard Skills

Skill Name	Active Job Ads	
Microsoft Excel	6,025	
Microsoft Office	5,977	
Manufacturing	4,376	
Autodesk AutoCAD	4,024	
Microsoft Project	3,007	
Microsoft PowerPoint	2,887	
Computer Aided Design Software (CAD Software)	2,801	
Agile	2,235	
Presentation	2,175	
Microsoft Word	1,944	

Soft Skills

Skill Name	Active Job Ads	
Communication (Verbal and written skills)	26,449	
Cooperative/Team Player	19,042	
Project Management	15,988	
Supervision/Management	11,504	
Problem Solving	8,083	
Organization	6,281	
Self-Motivated/Ability to Work Independently/Self Leadership	6,150	
Leadership	5,833	
Interpersonal Relationships/Maintain Relationships	5,664	
Analytical	5,130	

Job Titles

Job Title	Active Job Ads	
Project Manager	1,555	
Project Engineer	638	
Quality Engineer	321	
Engineering Manager	269	
Civil Engineer	222	
Director of Engineering	170	
Assistant Project Manager	166	
Senior Project Engineer	161	
Senior Project Manager	154	
Technical Project Manager	143	

Job Types

Type	Active Job Ads	
Full-Time	23,699	
Permanent	4,499	
Remote	3,769	
Temporary (unspecified)	1,683	
Part-Time	712	
Temporary (long-term)	369	
Temporary (short-term)	144	
Temp-to-Hire	119	
Remote Not Indicated	36,972	

Programs

Program Name	Active Job Ads	
Engineering	10,135	
Civil Engineering	4,132	
Mechanical Engineering	3,435	
Computer Science	2,428	
Electrical Engineering	2,174	
Science	2,101	
Mathematics	2,002	
Construction Management	1,837	
Technical	1,375	
Architecture	1,356	

Education Levels

Minimum Education Level	Active Job Ads	
Bachelor's degree	24,734	
Master's degree	1,844	
High school diploma or equivalent	1,345	
Associate's degree	866	
Doctoral or professional degree	251	
Unspecified/other	11,701	

California Regional Map



FAQ

What is CIP?

The 2010 Classification of Instructional Programs (CIP) is taxonomy of instructional program classifications and descriptions. It was developed and has been updated by the U.S. Department of Education's National Center for Education Statistics (NCES).

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452 occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

What is the source of the job ads?

Job ads data are online job posts from the Real-Time Intelligence (RTI) data set, produced wholly by Chmura and gleaned from over 40,000 websites. Data reflect ads active during the last twelve month period ending 06/29/2023 and advertised for any Zip Code Tabulation Area in or intersecting with the region for which this report was produced. Historical ad volume is revised as additional data are made available and processed. Since many extraneous factors can affect short-term volume of online job postings, time-series data can be volatile and should be used with caution. All ad counts represent deduplicated figures.

What is the program-to-occupation crosswalk?

Training programs are classified according to the Classification of Instructional Programs (CIP codes). For relating training programs, this report uses a modified version of the CIP to SOC crosswalk from the National Center for Education Statistics (NCES). While this is a very helpful crosswalk for estimating occupation production from training program awards data, the crosswalk is neither perfect nor comprehensive. Indeed, it is hard to imagine such a crosswalk being perfect since many training program graduates for one reason or another do not end up employed in occupations that are most related to the training program from which they graduated. Therefore, the education program analyses should be considered in this light.

As an example of the many scenarios that may unfold, consider a journalism degree that crosswalks into three occupations: editors, writers, and postsecondary communications teachers. Graduates with a journalism degree may get a job in one of these occupations—and that may be the most-likely scenario—but a good number of these graduates may get a job in a different occupation altogether (the job may be somewhat related, such as a reporter, or the job may be totally unrelated, such as a real estate agent). Furthermore, a graduate may stay in school or go back to school for a degree that will lead to other occupation possibilities. Still another possibility includes the graduate not entering the labor market (maybe being unemployed, being a non-participant, or moving to another region).

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth

demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an occupation (or industry) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the “all industry” level to the 6-digit level. The first two digits define the top level category, known as the “sector,” which is the level examined in this report.

About This Report

This report and all data herein were produced by JobsEQ®, a product of Chmura Economics & Analytics. The information contained herein was obtained from sources we believe to be reliable. However, we cannot guarantee its accuracy and completeness.