JOBSeQ

Education Report

Electrical and Electronics Engineering

California

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Definition of Electrical and Electronics Engineering, CIP 14.1001

A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of electrical and electronic systems and their components, including electrical power generation systems; and the analysis of problems such as superconductor, wave propagation, energy storage and retrieval, and reception and amplification.

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Awards

The table below is a list of postsecondary awards in CIP 14.1001 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		516	213	$17,652
University of Southern California		74	556	$26,021
University of California-Los Angeles		143	217	$13,393
University of California-San Diego		166	123	$15,632
San Jose State University		132	154	$14,603
Stanford University		31	228	$14,402
California State Polytechnic University-Pomona		152	13	$12,942
California State University-Long Beach		145	20	$9,171
California Polytechnic State University-San Luis Obispo		141	20	$20,708
University of California-Santa Barbara		65	87	$17,333
University of California-Irvine		101	48	$11,633
San Diego State University		117	28	$6,867
University of California-Riverside		60	69	$13,502
California State University-Los Angeles		90	28	$2,695
California State University-Sacramento		90	23	$7,778
California State University-Northridge		79	19	$8,708
University of California-Santa Cruz		53	25	$19,615
California State University-Fullerton		53	20	$4,939
University of California-Davis			69	$16,640
Naval Postgraduate School			56	
California Institute of Technology		14	37	$30,162
Southern California Institute of Technology		45		$27,298
San Francisco State University		44		$13,641
California State University-Chico		36		$13,749
California State University-Bakersfield		24		$7,368
Sonoma State University		24		$7,055
University of San Diego		22		$34,155
Santa Clara University		20		$48,469
California State University-Fresno		19		$6,336

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Schools	Certs & 2yr Awards[1]	4yr Awards[2]	Post-Grad Awards[3]	Avg Net Price[4]
National University		19		$9,966
Loyola Marymount University		14	1	$40,180
University of the Pacific		7		$21,311
San Francisco Bay University			2	$17,043
International Technological University			1	
Total	0	2,496	2,057	

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.

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Occupation Crosswalk

The below table lists all occupations linked with the program, Electrical and Electronics Engineering, CIP 14.1001.

		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%
17-2011	Aerospace Engineers	Bachelor's degree	None	None	1%	3%	2%	50%	44%
17-2061	Computer Hardware Engineers	Bachelor's degree	None	None	2%	3%	5%	46%	43%
17-2071	Electrical Engineers	Bachelor's degree	None	None	2%	3%	4%	52%	39%
17-2072	Electronics Engineers, Except Computer	Bachelor's degree	None	None	2%	3%	4%	51%	40%
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 Aerospace Engineers (17-2011)

Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.

Definition of Computer Hardware Engineers (17-2061)

Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components.

Definition of Electrical Engineers (17-2071)

Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

Definition of Electronics Engineers, Except Computer (17-2072)

Research, design, develop, or test electronic components and systems for commercial, industrial, military, or scientific use employing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.

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.

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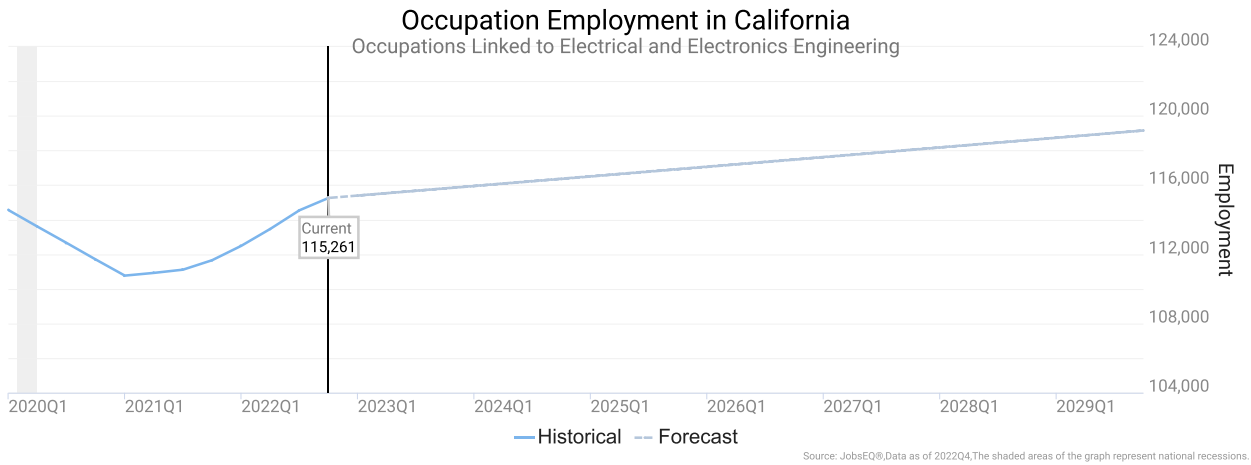
Occupation Details

As of 2022Q4, total employment for occupations linked to Electrical and Electronics Engineering in California was 115,261. Over the past three years, linked occupations added 864 jobs in the region and are expected to need in aggregate approximately 57,061 newly trained workers over the next seven years.

Snapshot of Occupations Linked to Electrical and Electronics Engineering in California[1]

		Current						3-Year History	7-Year Forecast				
SOC	Occupation	Empl	Mean Ann Wages[2]	LQ	Unempl	Unempl Rate	Online Job Ads[3]	Ann %	Total Demand	Exits	Transfers	Empl Growth	Avg Ann Growth %
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%
17-2071	Electrical Engineers	28,837	$134,000	1.22	292	1.0%	2,639	1.7%	13,740	5,157	7,632	952	0.5%
17-2072	Electronics Engineers, Except Computer	21,392	$137,900	1.60	217	1.0%	1,228	-2.0%	10,871	3,883	5,747	1,240	0.8%
17-2061	Computer Hardware Engineers	19,468	$179,300	2.00	510	2.7%	784	1.0%	9,181	2,904	5,808	470	0.3%
17-2011	Aerospace Engineers	8,695	$143,000	1.23	5	0.1%	417	-1.4%	3,864	1,374	2,124	367	0.6%
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	**115,261**	**$162,000**	**1.41**	**1,413**	**1.3%**	**11,922**	**0.3%**	**57,061**	**18,952**	**34,216**	**3,893**	**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.



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.

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Employment by Industry

The table illustrates the industries in California which most employ occupations linked to Electrical and Electronics Engineering. The single industry most employing these occupations in the region is Architectural, Engineering, and Related Services, NAICS 5413. This industry employs 17,683 workers in the linked occupations—employment which is expected to increase by 559 jobs over the next ten years; furthermore, 11,753 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 Electrical and Electronics Engineering in California

		Current		10-Year Demand			
NAICS Code	Industry Title	% of Occ Empl	Empl	Exits	Transfers	Empl Growth	Total Demand
5413	Architectural, Engineering, and Related Services	15.3%	17,683	3,988	7,765	559	12,313
5417	Scientific Research and Development Services	11.6%	13,413	3,130	5,887	1,505	10,523
3344	Semiconductor and Other Electronic Component Manufacturing	9.3%	10,746	2,581	4,623	1,131	8,335
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	9.1%	10,478	2,403	4,217	1	6,621
3364	Aerospace Product and Parts Manufacturing	7.3%	8,357	1,855	3,196	-268	4,783
3341	Computer and Peripheral Equipment Manufacturing	6.9%	7,957	1,762	3,434	263	5,458
5415	Computer Systems Design and Related Services	5.3%	6,100	1,399	2,557	364	4,319
5511	Management of Companies and Enterprises	2.6%	3,004	683	1,303	77	2,063
5171	Wired and Wireless Telecommunications (except Satellite)	2.3%	2,674	716	1,102	525	2,343
2211	Electric Power Generation, Transmission and Distribution	2.2%	2,544	582	956	-244	1,294
6113	Colleges, Universities, and Professional Schools	1.9%	2,188	930	891	267	2,088
5416	Management, Scientific, and Technical Consulting Services	1.4%	1,619	387	730	226	1,343
3342	Communications Equipment Manufacturing	1.3%	1,529	350	609	-44	915
5613	Employment Services	1.2%	1,420	344	569	90	1,003
2382	Building Equipment Contractors	1.2%	1,331	318	517	-20	816
2212	Natural Gas Distribution	1.0%	1,198	280	479	-26	733
3391	Medical Equipment and Supplies Manufacturing	1.0%	1,181	270	548	94	912
5182	Computing Infrastructure Providers, Data Processing, Web Hosting, and Related Services	0.9%	1,088	247	498	174	920
9281	National Security and International Affairs	0.9%	1,024	231	405	-39	597
9221	Justice, Public Order, and Safety Activities	0.8%	972	216	415	-12	619
	All Others	16.3%	18,754	4,403	8,177	987	13,568

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.

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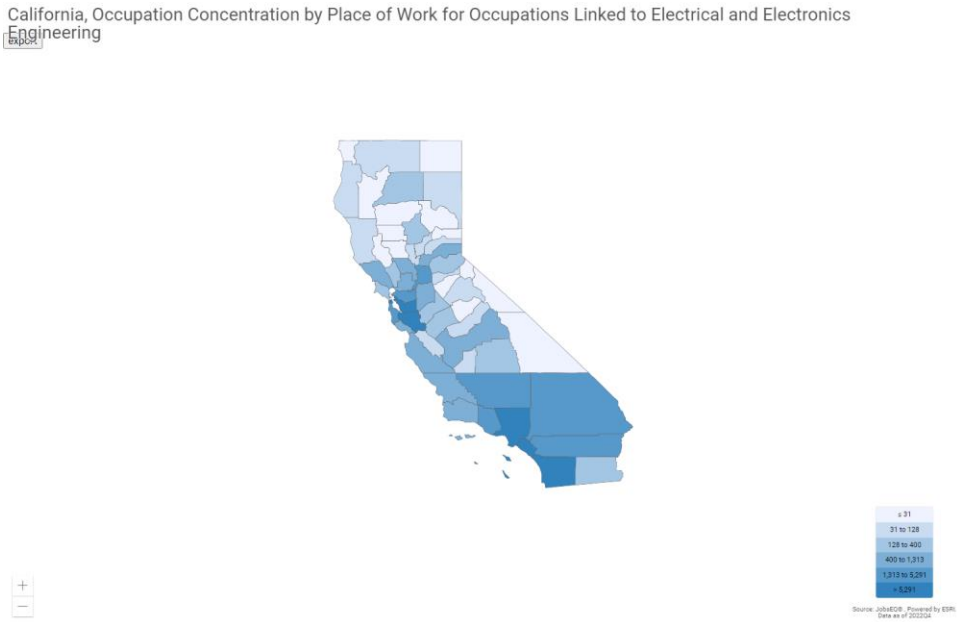
Geographic Distribution

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



Top Counties with Employment Linked to Electrical and Electronics Engineering, 2022Q4

Region	Employment
Los Angeles County, California	22,878
Santa Clara County, California	21,982
San Diego County, California	14,332
Orange County, California	12,053
Alameda County, California	7,672
San Francisco County, California	5,291
San Mateo County, California	4,187
Sacramento County, California	3,239
San Bernardino County, California	2,619
Ventura County, California	2,088

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.

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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.

Summary[1]

	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®

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.

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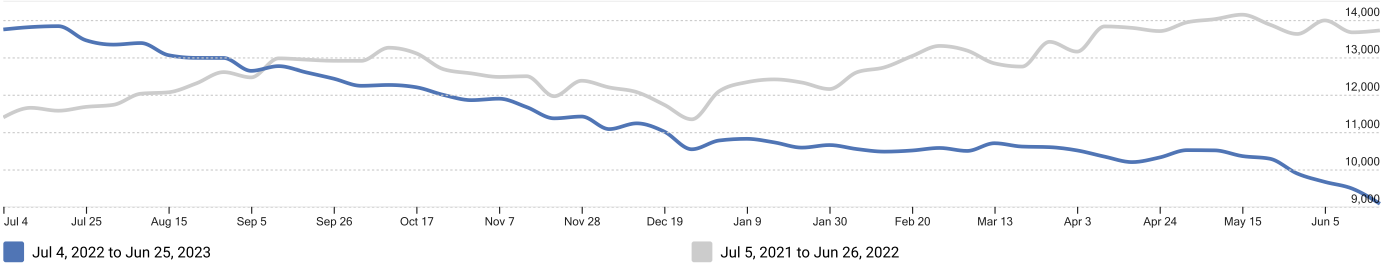
RTI (Job Postings)

Active Job Ads by Date



Occupations

SOC	Occupation	Active Job Ads
11-9041.00	Architectural and Engineering Managers	36,132
17-2071.00	Electrical Engineers	13,326
17-2072.00	Electronics Engineers, Except Computer	5,705
17-2061.00	Computer Hardware Engineers	3,730
17-2011.00	Aerospace Engineers	3,191
25-1032.00	Engineering Teachers, Postsecondary	592
17-2072.01	Radio Frequency Identification Device Specialists	53

Locations

Location	Active Job Ads
San Diego, California	4,030
San Jose, California	2,302
Los Angeles, California	2,134
San Francisco, California	1,968
Irvine, California	1,660
Sunnyvale, California	1,559
Palmdale, California	1,532
Santa Clara, California	1,527
Santa Clara Valley (Cupertino), California, United States	1,425

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Locations

Location	Active Job Ads	
El Segundo, California	980	

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Employers

Employer Name	Active Job Ads
NORTHROP GRUMMAN	4,005
Boeing	2,924
Apple	2,554
LOCKHEED MARTIN	1,652
Jobot	1,132
Cybercoders	1,077
Raytheon Technologies	705
General Atomics Aeronautical Systems	681
TESLA	557
gpac	549

Certifications

Certificate Name	Active Job Ads
Secret Clearance	4,613
Project Management Professional (PMP)	1,439
Licensed Professional Engineer	1,102
Driver's License	905
Engineer in Training (EIT)	569
Certified Construction Manager (CCM)	178
Certified Quality Engineer (CQE)	133
Six Sigma Green Belt Certification (SSGB)	93
LEED Accredited Professional (not specified)	91
Cisco Certified Network Associate (CCNA)	57

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Hard Skills

Skill Name	Active Job Ads
Microsoft Office	7,622
Microsoft Excel	7,398
Python	6,826
Manufacturing	5,781
Computer Aided Design Software (CAD Software)	5,201
Computer Programming/Coding	4,514
Mathematics	4,280
Autodesk AutoCAD	4,107
MATLAB	4,047
Microsoft PowerPoint	3,704

Soft Skills

Skill Name	Active Job Ads
Communication (Verbal and written skills)	38,672
Cooperative/Team Player	29,259
Project Management	17,433
Problem Solving	11,746
Supervision/Management	11,697
Self-Motivated/Ability to Work Independently/Self Leadership	9,020
Organization	7,889
Analytical	7,849
Interpersonal Relationships/Maintain Relationships	7,552
Leadership	7,546

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Job Titles

Job Title	Active Job Ads
Project Manager	1,555
Project Engineer	607
Electrical Engineer	451
Quality Engineer	321
Engineering Manager	269
Senior Electrical Engineer	244
Director of Engineering	170
Assistant Project Manager	166
Senior Project Engineer	160
Engineer	155

Job Types

Type	Active Job Ads
Full-Time	34,411
Permanent	5,802
Remote	5,512
Temporary (unspecified)	2,767
Part-Time	1,021
Temporary (long-term)	664
Temporary (short-term)	277
Temp-to-Hire	181
Remote Not Indicated	57,217

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Programs

Program Name	Active Job Ads
Engineering	16,203
Electrical Engineering	9,603
Computer Science	6,820
Mechanical Engineering	5,072
Mathematics	5,068
Physics	4,078
Science	3,379
Chemistry	2,848
Technical	2,618
Civil Engineering	2,600

Education Levels

Minimum Education Level	Active Job Ads
Bachelor's degree	38,033
Master's degree	3,584
High school diploma or equivalent	2,037
Associate's degree	1,484
Doctoral or professional degree	628
Unspecified/other	16,963

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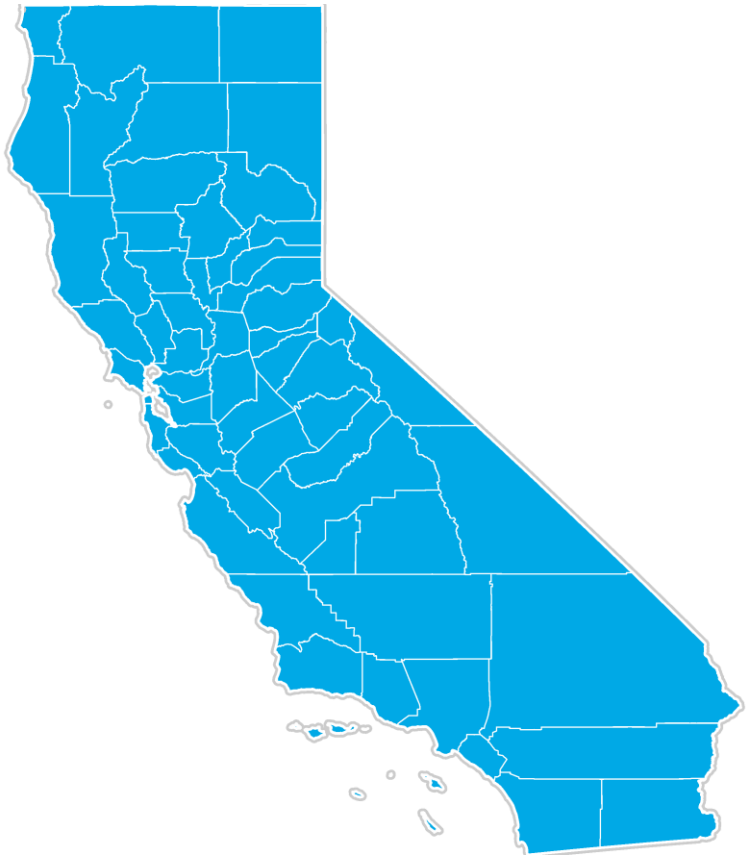
California Regional Map



Source: JobsEQ®, http://www.chmuraecon.com/jobseq
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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

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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
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