




Computer Systems Analysis

Labor Market Analysis for San Diego College of Continuing Education

September 2021

Summary

NEW PROGRAM RECOMMENDATION?	EVIDENCE OF A SUPPLY GAP?	AT OR ABOVE THE LIVING WAGE?	EXPECTED EDUCATION FOR MAJORITY OF OCCUPATIONS ANALYZED
 Proceed with New Program	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> Bachelor's Degree+ <input type="checkbox"/> Associate Degree <input type="checkbox"/> Some College or Certificate <input type="checkbox"/> HS Diploma or Equivalent <input type="checkbox"/> Less than a HS Diploma <input type="checkbox"/> Apprenticeship
SUPPORT FOR PROGRAM MODIFICATION?	NUMBER OF INSTITUTIONS THAT PROVIDE TRAINING	NUMBER OF ANNUAL JOB OPENINGS	
<input checked="" type="checkbox"/> <input type="checkbox"/>	<div style="background-color: #4a7c9c; color: white; padding: 2px; text-align: center; font-weight: bold;">LOW</div> 	<div style="background-color: #4a7c9c; color: white; padding: 2px; text-align: center; font-weight: bold;">HIGH</div> 	

This report provides labor market information for occupations selected by San Diego College of Continuing Education for its *Computer Systems Analysis* program. These occupations include “Computer Network Architects,” “Computer Network Support Specialists,” “Computer Systems Analysts,” “Database Administrators and Architects,” and “Software Developers and Software Quality Assurance Analysts and Testers.” According to available labor market information, *Computer Systems Analysis Occupations* in San Diego County have a labor market demand of 2,736 annual job openings (while average demand for a single occupation in San Diego County is 242 annual job openings). On average, no institution supplies for-credit awards or noncredit awards in San Diego County for these occupations. In short, the region supplies zero for-credit and noncredit awards for 2,736 annual job openings, suggesting that there is a supply gap in the labor market. Entry-level and median wages for these occupations are above the living wage. This brief recommends proceeding with a new program or program modification because 1) there is a supply gap; and 2) entry-level and median wages are above the living wage. The college should note that **the typical entry-level education for these occupations is a bachelor's degree.**

Introduction

This report provides labor market information in San Diego County for occupations related to the six-digit Taxonomy of Programs (TOP)¹ code, Computer Systems Analysis (TOP 0707.30). The purpose of this brief is to assist noncredit program providers in the region, such as San Diego College of Continuing Education (SDCCE), with program development and review. SDCCE identified the following occupational codes from the Standard Occupational Classification (SOC)² system for *Computer Systems Analysis*, which will be the focus of this report:

- **Computer Network Architects** (SOC 15-1241): Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning, including analysis of capacity needs for network infrastructures. May also design network and computer security measures. May research and recommend network and data communications hardware and software.
- **Computer Network Support Specialists** (SOC 15-1231): Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.
- **Computer Systems Analysts** (SOC 15-1211): Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.
- **Database Administrators and Architects** (SOC 15-1245): Administer, test, and implement computer databases, applying knowledge of database management systems. Coordinate changes to computer databases. Identify, investigate, and resolve database performance issues, database capacity, and database scalability. May plan, coordinate, and implement security measures to safeguard computer databases. Design strategies for enterprise databases, data warehouse systems, and multidimensional networks. Set standards for database operations, programming, query processes, and security. Model, design, and construct large relational databases or data warehouses. Create and optimize data models for warehouse infrastructure and workflow. Integrate new systems with existing warehouse structure and refine system performance and functionality.

¹ Taxonomy of Programs (TOP) is a system of codes used by the California Community Colleges for the purpose of collecting, calculating, or disseminating data about similar training programs.

² The Standard Occupational Classification (SOC) system is used by federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating or disseminating data. [bls.gov/soc](https://www.bls.gov/soc).

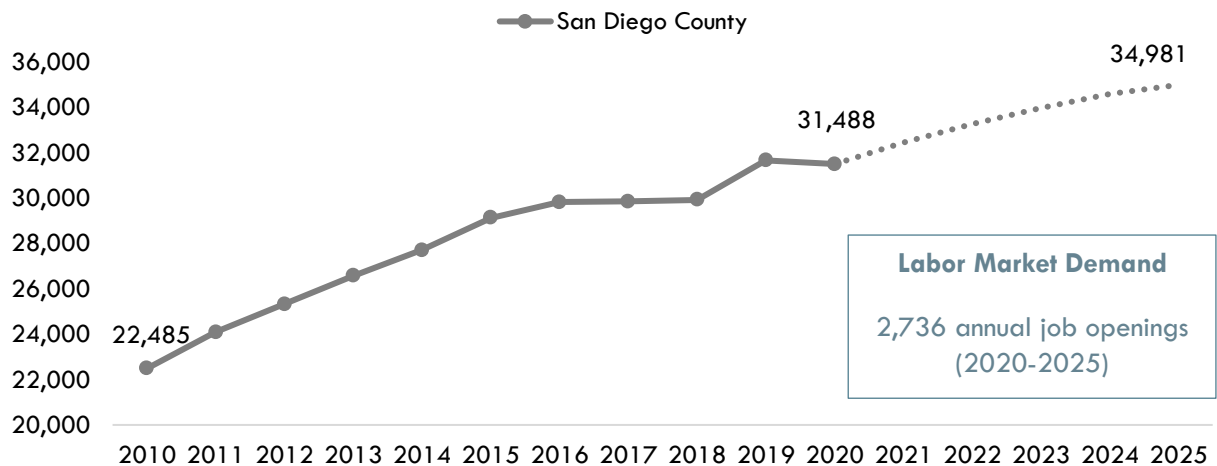
- Software Developers and Software Quality Assurance Analysts and Testers (SOC 15-1256):** Research, design, and develop computer and network software or specialized utility programs. Analyze user needs and develop software solutions, applying principles and techniques of computer science, engineering, and mathematical analysis. Update software or enhance existing software capabilities. May work with computer hardware engineers to integrate hardware and software systems, and develop specifications and performance requirements. May maintain databases within an application area, working individually or coordinating database development as part of a team. Develop and execute software tests to identify software problems and their causes. Test system modifications to prepare for implementation. Document software and application defects using a bug tracking system and report defects to software or web developers. Create and maintain databases of known defects. May participate in software design reviews to provide input on functional requirements, operational characteristics, product designs, and schedules.

For the purpose of this report, these occupations are referred to as *Computer Systems Analysis Occupations*.

Projected Occupational Demand

Between 2020 and 2025, *Computer Systems Analysis Occupations* are projected to increase by 3,493 net jobs or 11 percent (Exhibit 1a). Employers in San Diego County will need to hire 2,736 workers annually to fill new jobs and backfill jobs due to attrition caused by turnover and retirement, for example.

Exhibit 1a: Number of Jobs for Computer Systems Analysis Occupations (2010-2025)³



³ EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

Exhibit 1b disaggregates the projected number of jobs change by occupation. “Software Developers and Software Quality Assurance Analysts and Testers” are projected to have the most labor market demand between 2020 and 2025, with 1,831 annual job openings.

**Exhibit 1b: Number of Jobs for Computer Systems Analysis Occupations
in San Diego County (2020-2025)⁴**

Occupational Title	2020 Jobs	2025 Jobs	2020 - 2025 Net Jobs Change	2020-2025 % Net Jobs Change	Annual Job Openings (Demand)
Software Developers and Software Quality Assurance Analysts and Testers	19,936	22,622	2,686	13%	1,831
Computer Systems Analysts	6,826	7,325	499	7%	545
Computer Network Architects	1,997	2,091	94	5%	134
Computer Network Support Specialists	1,338	1,454	116	9%	117
Database Administrators and Architects	1,391	1,489	98	7%	109
Total	31,488	34,981	3,493	11%	2,736

Earnings

Exhibit 2a disaggregates hourly earnings by occupation. The entry-level hourly earnings for *Computer Systems Analysis Occupations* range from \$23.95 to \$44.63.

Exhibit 2a: Hourly Earnings for Computer Systems Analysis Occupations in San Diego County⁵

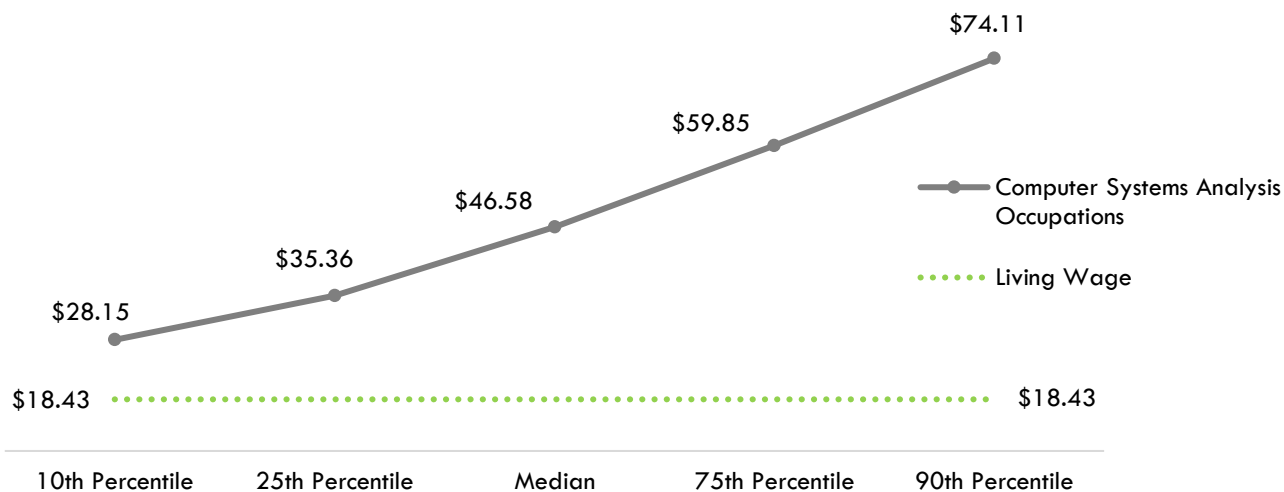
Occupational Title	Entry-Level Hourly Earnings (25 th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75 th Percentile)
Software Developers and Software Quality Assurance Analysts and Testers	\$44.63	\$56.99	\$70.49
Computer Network Architects	\$39.13	\$51.24	\$65.78
Database Administrators and Architects	\$35.58	\$48.96	\$60.68
Computer Systems Analysts	\$33.49	\$43.85	\$57.64
Computer Network Support Specialists	\$23.95	\$31.84	\$44.66

⁴ EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

⁵ EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

On average, the entry-level hourly earnings for *Computer Systems Analysis Occupations* are **\$35.36**; this is more than the living wage for a single adult in San Diego County, which is **\$18.43** per hour (Exhibit 2b).⁶

Exhibit 2b: Average Hourly Earnings⁷ for Computer Systems Analysis Occupations in San Diego County⁸



Educational Supply

Educational supply for an occupation can be estimated by analyzing the number of awards in related Taxonomy of Programs (TOP) or Classification of Instructional Programs (CIP) codes.⁹ According to TOP and CIP¹⁰ data, no community college reported supplying the region with for-credit awards for Computer Systems Analysis (TOP 0707.30) (Exhibit 3).

Exhibit 3: Number of For-Credit Awards (Certificates and Degrees) Conferred by Postsecondary Institutions (Program Years 2017-18 through 2019-20)

College	Award Type	PY 17-18	PY 18-19	PY 19-20	3-Yr Total Average
N/A	N/A	0	0	0	0
Total		0	0	0	0

⁶ "Family Needs Calculator (formerly the California Family Needs Calculator)," Insight: Center for Community Economic Development, last updated 2021. insightccd.org/family-needs-calculator/.

⁷ 10th and 25th percentiles could be considered entry-level wages, and 75th and 90th percentiles could be considered experienced wages for individuals who may have been in the occupation longer, received more training than others, etc.

⁸ EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

⁹ TOP data comes from the California Community Colleges Chancellor's Office MIS Data Mart (datamart.cccco.edu) and CIP data comes from the Integrated Postsecondary Education Data System (nces.ed.gov/ipeds/use-the-data).

¹⁰ There is one CIP code related to Computer Systems Analysis (TOP 0707.30): Computer Systems Analysis/Analyst (CIP 11.0501).

In terms of noncredit awards, San Diego College of Continuing Education does not provide any noncredit awards for Computer Systems Analysis (TOP 0707.30), with a three-year average of zero noncredit awards (program years 2017-18 through 2019-20) (Exhibit 4).

**Exhibit 4: Number of Noncredit Awards Conferred by SDCCE
(Program Years 2017-18 through 2019-20)**

Program Title	Award Type	PY 17-18	PY 18-19	PY 19-20	3-Yr Total Average
Programming with Python	Noncredit	0	0	0	0

Demand vs. Supply

Comparing labor demand (annual openings) with labor supply¹¹ suggests that there is a supply gap in San Diego County, with 2,736 annual openings and zero for-credit and noncredit awards supplied by the region (Exhibit 5).

Exhibit 5: Labor Demand (Annual Openings) Compared with Labor Supply (Average Annual Awards)

TOP6 Program	Demand (Annual Openings)	Supply (Total Annual Average Supply)		Supply Gap or Oversupply
		Noncredit	For-Credit	
Computer Systems Analysis (TOP 0707.30)	2,736	0	0	2,736

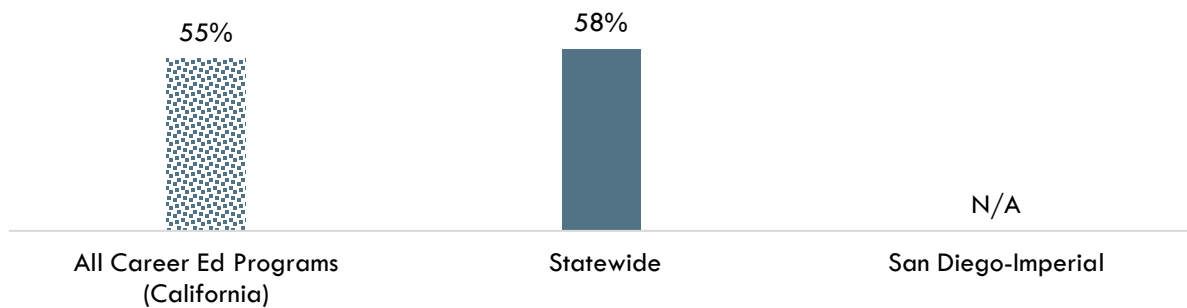
Please note: This is a basic analysis of supply and demand of labor. The data does not include workers currently in the labor force who could fill these positions or workers who are not captured by publicly available data. This data should be used to discuss the potential gaps or oversupply of workers; however, it should not be the only basis for determining whether or not a program should be developed.

¹¹ Labor supply can be found from two different sources: EMSI or the California Community Colleges Chancellor's Office MIS Data Mart. EMSI uses CIP codes while MIS uses TOP codes. Different coding systems result in differences in the supply numbers.

Student Outcomes and Regional Comparisons

According to the California Community Colleges LaunchBoard, 58 percent of students statewide earned a living wage after completing a Computer Systems Analysis (0707.30) program, compared to 55 percent of students in Career Education programs in general across the state (Exhibit 6a).¹²

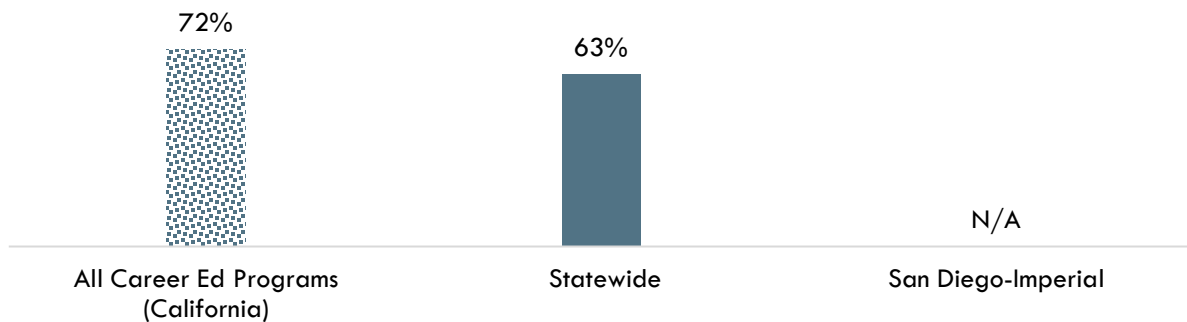
**Exhibit 6a: Percentage of Students Who Earned a Living Wage by Program
(Computer Systems Analysis, PY 2017-18)¹³**



"N/A" indicates insufficient data

According to the California Community Colleges LaunchBoard, 63 percent of students statewide obtained a job closely related to their field of study after completing a Computer Systems Analysis (0707.30) program, compared to 72 percent of students in Career Education programs in general across the state (Exhibit 6b).¹⁴

**Exhibit 6b: Percentage of Students in a Job Closely Related to Field of Study by Program
(Computer Systems Analysis, PY 2016-17)¹⁵**



"N/A" indicates insufficient data

¹² "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹³ Among completers and skills builders who exited, the proportion of students who attained a living wage.

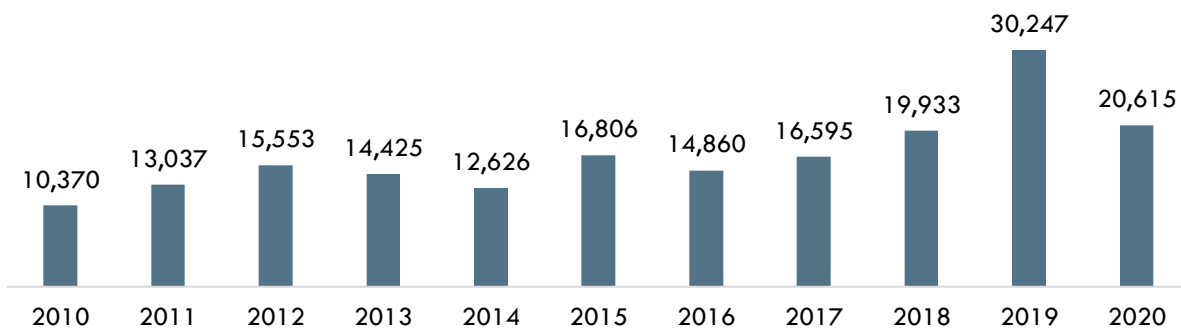
¹⁴ "California Community Colleges Strong Workforce Program," California Community Colleges, calpassplus.org/LaunchBoard/SWP.aspx.

¹⁵ Most recent year with available data is Program Year 2016-17. Percentage of Students in a Job Closely Related to Field of Study: Among students who responded to the CTEOS, the percentage reporting employment in the same or similar field as their program of study.

Online Job Postings

This report analyzes not only historical and projected (traditional LMI) data, but also recent data from online job postings (real-time LMI). Online job postings may provide additional insight about recent changes in the labor market that are not captured by historical data. Between 2010 and 2020, there was an average of 16,824 online job postings per year for *Computer Systems Analysis Occupations* in San Diego County (Exhibit 7). Please note that online job postings do **not** equal labor market demand; demand is represented by annual job openings (see Exhibit 1b). Employers may post a position multiple times for various reasons, such as increasing the pool of applicants, for example.

Exhibit 7: Number of Online Job Postings for Computer Systems Analysis Occupations in San Diego County (2010-2020)¹⁶



Top Employers

Between January 1, 2018 and December 31, 2020, the top five employers in San Diego County for *Computer Systems Analysis Occupations* were [Qualcomm](#), [Northrop Grumman](#), [General Atomics](#), [Intuit](#) and [Teradata Operations](#) based on online job postings (Exhibit 8).

Exhibit 8: Top Employers for Computer Systems Analysis Occupations in San Diego County¹⁷

Top Employers	
<ul style="list-style-type: none"> • Qualcomm • Northrop Grumman • General Atomics • Intuit • Teradata Operations, Inc. 	<ul style="list-style-type: none"> • Booz Allen Hamilton Inc. • Viasat • CACI • ServiceNow • University of California San Diego

¹⁶ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2010-2020.

¹⁷ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Education, Skills, and Certifications

Except for “Computer Network Support Specialists,” *Computer Systems Analysis Occupations* have a national educational attainment ranging from an [associate degree](#) to a [bachelor’s degree](#) (Exhibit 9a).

Exhibit 9a: National Educational Attainment for Computer Systems Analysis Occupations¹⁸

Occupational Title	Typical Entry-Level Education
Software Developers and Software Quality Assurance Analysts and Testers	Bachelor's degree
Computer Network Architects	Bachelor's degree
Database Administrators and Architects	Bachelor's degree
Computer Systems Analysts	Bachelor's degree
Computer Network Support Specialists	Associate's degree

Based on online job postings between January 1, 2018 and December 31, 2020 in San Diego County, employers posted a [bachelor’s degree](#) as the educational requirement for *Computer Systems Analysis Occupations* (Exhibit 9b).¹⁹

Exhibit 9b: Educational Requirements for Computer Systems Analysis Occupations in San Diego County²⁰



*may not total 100 percent due to rounding

¹⁸ EMSI 2021.2; QCEW, Non-QCEW, Self-Employed.

¹⁹ Burning Glass Technologies, “Labor Insight Real-Time Labor Market Information Tool.” 2018-2020.

²⁰ “Educational Attainment for Workers 25 Years and Older by Detailed Occupation,” Bureau of Labor Statistics, last modified April 9, 2021. bls.gov/emp/tables/educational-attainment.htm.

Exhibit 10 lists the top specialized, soft, and software skills that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 10: Top Skills for Computer Systems Analysis Occupations in San Diego County²¹

Specialized Skills	Soft Skills	Software Skills
<ul style="list-style-type: none"> • Software Engineering • Software Development • Object-Oriented Analysis and Design • Scrum • Project Management • Debugging • Oracle • DevOps • Unit Testing • Information Systems • Agile Development • Software Architecture • Computer Engineering • Quality Assurance and Control • Scheduling 	<ul style="list-style-type: none"> • Communication Skills • Teamwork / Collaboration • Troubleshooting • Problem Solving • Writing • Planning • Research • Written Communication • Detail-Oriented • Creativity • Organizational Skills • Verbal / Oral Communication • Self-Starter • Mentoring • Leadership 	<ul style="list-style-type: none"> • Java • SQL • Python • JavaScript • Linux • C++ • Microsoft C# • Git • Oracle • .NET • Extensible Markup Language • SQL Server • Microsoft Excel • UNIX • MySQL

²¹ Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

Exhibit 11 lists the top certifications that appeared in online job postings between January 1, 2018 and December 31, 2020.

Exhibit 11: Top Certifications for Computer Systems Analysis Occupations in San Diego County²²

Top Certifications in Online Job Postings

1. Security Clearance
 2. CompTIA Security+
 3. Cisco Certified Network Associate (CCNA)
 4. IT Infrastructure Library (ITIL) Certification
 5. Cisco Certified Network Professional (CCNP)
 6. Certified Information Systems Security Professional (CISSP)
 7. Driver's License
 8. Project Management Certification
 9. Cisco Certified Internetwork Expert (CCIE)
 10. SANS/GIAC Certification
 11. Microsoft Certified Solutions Associate (MCSA)
 12. Project Management Professional (PMP)
 13. CompTIA Network+
 14. CompTIA Linux+
 15. Microsoft Certified Solutions Expert (MCSE)
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²² Burning Glass Technologies, "Labor Insight Real-Time Labor Market Information Tool." 2018-2020.

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Important Disclaimers

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. This study examines the most recent data available at the time of the analysis; however, data sets are updated regularly and may not be consistent with previous reports. Efforts have been made to qualify and validate the accuracy of the data and the report findings; however, neither the Centers of Excellence for Labor Market Research (COE), COE host district, nor California Community Colleges Chancellor's Office are responsible for the applications or decisions made by individuals and/or organizations based on this study or its recommendations.

This workforce demand report uses state and federal job projection data that was developed before the economic impact of COVID-19. The COE is monitoring the situation and will provide more information as it becomes available. Please consult with local employers to understand their current employment needs.