



## Computer Infrastructure and Support (TOP 0708.00)

September 2022

Prepared by the South Central Coast Center of Excellence for  
Labor Market Research

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### Program Recommendation

This report was compiled by the South Central Coast<sup>1</sup> Center of Excellence to provide regional labor market data for the program recommendation – Computer Infrastructure and Support. This report can help determine whether there is demand in the local labor market that is not being met by the supply from programs of study (CCC and non-CCC) that align with this occupation group.

### Key Findings

- In the South Central Coast region, **the number of jobs related to Computer Infrastructure and Support are expected to increase** for Computer and Information Research Scientists and Database Administrators and **remain steady** for Computer Systems Analysts, Computer Network Support Specialists, and Computer Network Architects.
- Computer Infrastructure and Support is anticipated to experience a **medium risk of automation** for Computer Network Support Specialists and a **low risk of automation** for the four other related occupations.
- In 2020 there were 1,203 regional completions in programs related to the occupations identified as aligned with Computer Infrastructure and Support and 467 openings, indicating an **oversupply**.
- Typical entry-level education ranges from an **Associate's degree** for Computer Network Support Specialists; to a **Bachelor's degree** for Computer Network Architects, Computer Systems Analysts, and Database Administrators; and a **Master's degree** for Computer and Information Research Scientists.
- Completers of Computer Infrastructure and Support programs from the 2018-2019 academic year, in the South Central Coast region, had a **median annual wage upon completion of \$41,676**.
- 54% of students are **employed within a year** after completing a program.
- 55% of students **attained a living wage** within a year of completion.
- Completers experienced an average of **+22%** change in earnings after exiting.
- 70% of students were **part-time**, 10% **skill builders**, 34% **first-generation**, and 73% **economically disadvantaged**.

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<sup>1</sup> The South Central Coast Region consists of San Luis Obispo County, Santa Barbara County, Ventura County, and the following cities from North Los Angeles County: Canyon Country, Castaic, Lake Hughes, Lancaster, Littlerock, Llano, Newhall, Palmdale, Pearblossom, Santa Clarita, Stevenson Ranch, and Valencia.

## Occupation Codes and Descriptions

There are five occupations in the standard occupational classification (SOC) system that were identified as related to Computer Infrastructure and Support for this analysis. The occupation titles and descriptions, as well as reported job titles, are included in Exhibit 1.

**Exhibit 1 – Occupation, description, and sample job titles**

<b>SOC Code</b>	<b>Title</b>	<b>Description</b>	<b>Sample of Reported Job Titles</b>
15-1211	<b>Computer Systems Analysts</b>	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.	Applications Analyst, Business Systems Analyst, Computer Analyst, Computer Systems Analyst, Computer Systems Consultant, Information Systems Analyst (ISA), Information Technology Analyst (IT Analyst), System Analyst, Systems Analyst
15-1221	<b>Computer and Information Research Scientists</b>	Conduct research into fundamental computer and information science as theorists, designers, or inventors. Develop solutions to problems in the field of computer hardware and software.	Computer Scientist, Computer Specialist, Control System Computer Scientist, Research Scientist, Scientific Programmer Analyst
15-1231	<b>Computer Network Support Specialists</b>	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 Network Specialist, IT Consultant (Information Technology Consultant), Network Specialist, Network Support Specialist, Network Technical Analyst, Network Technician, Personal Computer Network Analyst, Systems Specialist
15-1241	<b>Computer Network Architects</b>	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.	Design Engineer, Network Analyst, Network and Security Engineer, Network Consultant, Network Systems Consultant, Networking Systems and Distributed Systems Engineer, Solutions Architect, Telecommunications Analyst

SOC Code	Title	Description	Sample of Reported Job Titles
15-1242	<b>Database Administrators</b>	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.	Database Administration Manager, Database Administrator (DBA), Database Analyst, Database Coordinator, Information Systems Manager, System Administrator

Source: O\*NET Online

## Current and Future Employment

In the South Central Coast region, the number of jobs related to Computer Infrastructure and Support are expected to increase for Computer and Information Research Scientists and Database Administrators and remain steady for Computer Systems Analysts, Computer Network Support Specialists, and Computer Network Architects.

**Exhibit 2 – Five-year projections for Computer Infrastructure and Support in the South Central Coast region**

SOC	Occupation	2021 Jobs	2026 Jobs	2021-2026 Change	2021-2026 % Change
15-1211	Computer Systems Analysts	2,368	2,443	75	3%
15-1221	Computer and Information Research Scientists	404	434	30	7%
15-1231	Computer Network Support Specialists	639	661	22	3%
15-1241	Computer Network Architects	753	760	7	1%
15-1242	Database Administrators	340	357	17	5%

Source: Economic Modeling Specialists International (EMSI)

## Earnings

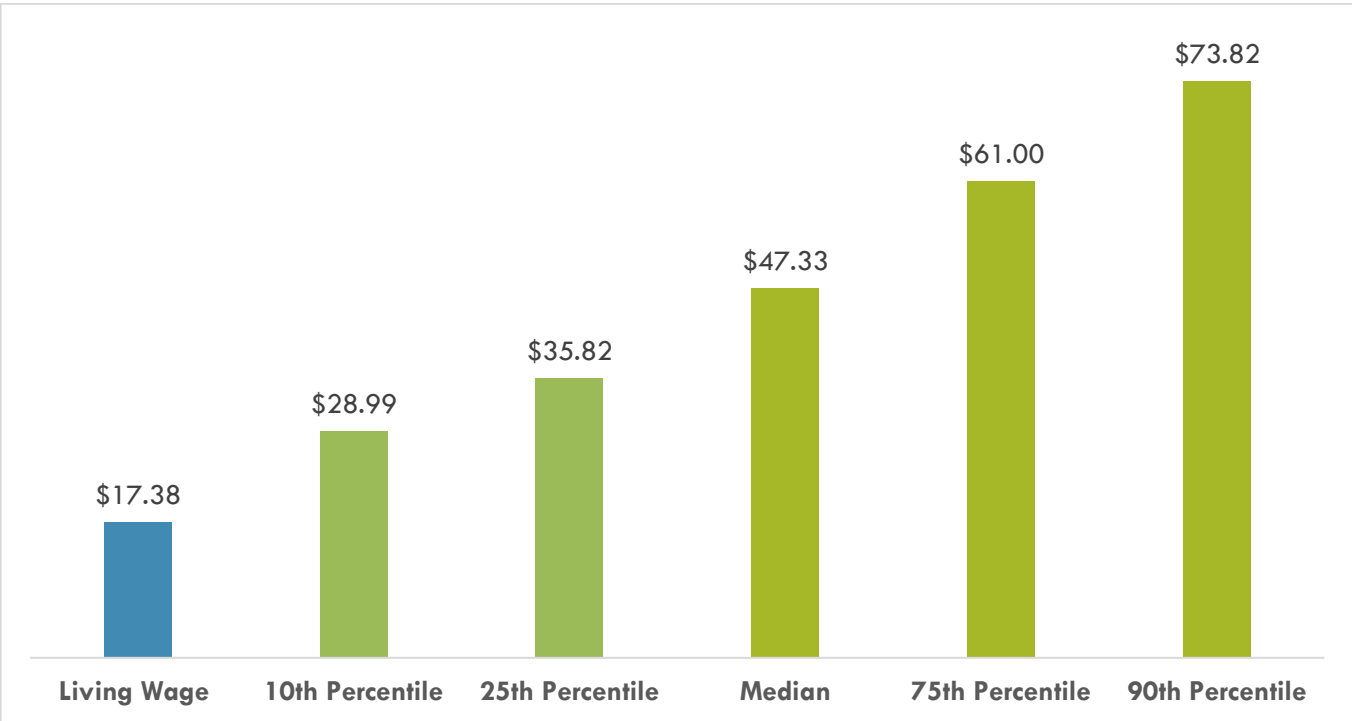
Exhibit 3 contains hourly wages and annual average earnings for these occupations. Entry-level hourly earnings are represented by the 25<sup>th</sup> percentile of wages, median hourly earnings are represented by the 50<sup>th</sup> percentile of wages, and experienced hourly earnings are represented by the 75<sup>th</sup> percentile of wages, demonstrating various levels of employment.

**Exhibit 3 – Earnings for Computer Infrastructure and Support in the South Central Coast region**

SOC	Occupation	Entry-Level Hourly Earnings	Median Hourly Earnings	Experienced Hourly Earnings
15-1211	Computer Systems Analysts	\$39.69	\$50.11	\$64.57
15-1221	Computer and Information Research Scientists	\$42.85	\$59.33	\$74.29
15-1231	Computer Network Support Specialists	\$26.27	\$32.98	\$41.76
15-1241	Computer Network Architects	\$37.11	\$46.89	\$63.33
15-1242	Database Administrators	\$33.16	\$47.33	\$61.05

Source: Economic Modeling Specialists International (EMSI)

**Exhibit 3b – Earnings for Computer Infrastructure and Support in the South Central Coast Region**



Source: Family Needs Calculator (Living wage is based on Single Adult household with no children); Economic Modeling Specialists International (EMSI)

## Employer Job Postings

In this research brief, real-time labor market information is used to provide a more nuanced view of the current job market, as it captures job advertisements for occupations relevant to the field of study. Employer job postings are consulted to understand who is looking in the field, and what they are looking for in potential candidates. To identify job postings related to Computer Infrastructure and Support the following standard occupational classifications were used:

15-1111	Computer and Information Research Scientists
15-1121	Computer Systems Analysts
15-1141	Database Administrators
15-1143	Computer Network Architects
15-1152	Computer Network Support Specialists

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## Top Occupations

In 2021, there were 1,698 employer postings for the occupations related to Computer Infrastructure and Support.

**Exhibit 4 – Top occupations by job postings**

SOC Code	Occupation	Job Postings, Full Year 2021
15-1121	Computer Systems Analysts	694
15-1141	Database Administrators	416
15-1143	Computer Network Architects	285
15-1111	Computer and Information Research Scientists	196
15-1152	Computer Network Support Specialists	107

Source: Labor Insight/Jobs (Burning Glass)

**Exhibit 4b – Top occupations and risk of automation**

SOC Code	Occupation	Risk of Automation
15-1121	Computer Systems Analysts	Low
15-1141	Database Administrators	Low
15-1143	Computer Network Architects	Low
15-1111	Computer and Information Research Scientists	Low
15-1152	Computer Network Support Specialists	Medium

Source: Labor Insight/Jobs (Burning Glass)

### Top Titles

The top job titles for employers posting ads for jobs related to Computer Infrastructure and Support are listed in Exhibit 5. Data Engineer is mentioned as the job title in 2% of all relevant job postings (33 postings).

**Exhibit 5 – Top Titles**

<b>Title</b>	<b>Job Postings, Full Year 2021</b>
Data Engineer	33
Data Scientist	32
Business Systems Analyst	31
Systems Analyst	21
Senior Network Engineer	20
Network Engineer	17
Salesforce Administrator	17
Database Administrator	16
Senior Data Engineer	16
It Business Analyst	15

Source: Labor Insight/Jobs (Burning Glass)

### Top Employers

Exhibit 6 lists the major employers hiring professionals in the Computer Infrastructure and Support field. The top employer posting job ads was Amgen. The top worksite cities in the region for these occupations were Thousand Oaks, Santa Barbara, Santa Clarita, Westlake Village, and Oxnard.

**Exhibit 6 – Top Employers (n=1,308)**

<b>Employer</b>	<b>Job Postings, Full Year 2021</b>
Amgen	120
Anthem Blue Cross	93
Northrop Grumman	26
Synaptein Solutions Inc	20
By Light Professional IT Services	15

Source: Labor Insight/Jobs (Burning Glass)

## Skills

The tables in Exhibit 7 list employers' most commonly requested skills in job postings related to Computer Infrastructure and Support. SQL is the most sought-after specialized skill for employers, followed by Python and Project Management. Communication Skills, Teamwork/Collaboration, and Troubleshooting were the most requested baseline skills. SQL, Python, and Microsoft Excel were the most commonly requested software and programming skills.

**Exhibit 7 – Specialized Skills (n= 17,276)**

<b>Skills</b>	<b>Job Postings, Full Year 2021</b>
SQL	450
Python	342
Project Management	269
Data Science	236
Systems Analysis	220
Information Systems	210
Technical Support	190
Business Process	184
Customer Service	172
Machine Learning	157

Source: Labor Insight/Jobs (Burning Glass)



**Exhibit 7b – Baseline Skills (n= 6,101)**

<b>Skills</b>	<b>Job Postings, Full Year 2021</b>
Communication Skills	608
Teamwork / Collaboration	498
Troubleshooting	435
Problem Solving	378
Planning	318
Microsoft Excel	284
Research	265
Organizational Skills	263
Writing	244
Detail-Oriented	231

Source: Labor Insight/Jobs (Burning Glass)

**Exhibit 7c – Software and Programming Skills (n= 7,128)**

<b>Skills</b>	<b>Job Postings, Full Year 2021</b>
SQL	450
Python	342
Microsoft Excel	284
Microsoft Office	225
Systems Analysis	220
Linux	146
Software Development	139
Java	134
Oracle	118
Tableau	102

Source: Labor Insight/Jobs (Burning Glass)

The table below lists the skill clusters most in demand for Computer Infrastructure and Support occupations.

**Exhibit 7d – Skill Clusters in Demand (n= 15,044)**

<b>Skill Cluster</b>	<b>Job Postings, Full Year 2021</b>
Information Technology: System Design and Implementation	563
Information Technology: SQL Databases and Programming	470
Business: Business Process and Analysis	425
Information Technology: Scripting Languages	348
Information Technology: Microsoft Office and Productivity Tools	331
Business: Project Management	326
Information Technology: Database Administration	325
Information Technology: Technical Support	315
Information Technology: Software Development Principles	309
Information Technology: General Networking	263

Source: Labor Insight/Jobs (Burning Glass)

### Industry Concentration

Exhibit 8 shows the industries with the most Computer Infrastructure and Support postings in the South Central Coast. Note: 35% of records have been excluded because they do not include an industry. As a result, the chart below may not be representative of the full sample.

**Exhibit 8 – Industries employing the most in the Computer Infrastructure and Support field, 2021**

<b>Industry</b>	<b>Occupation Group Jobs in Industry</b>	<b>% of Occupation Group in Industry</b>
Manufacturing	327	29%
Professional, Scientific, and Technical Services	245	22%
Finance and Insurance	173	16%
Public Administration	77	7%
Health Care and Social Assistance	50	5%

Source: Labor Insight/Jobs (Burning Glass)

## Certifications

Exhibit 9 lists the most in-demand certifications in the Computer Infrastructure and Support field. The top requested certification in job postings was Security Clearance.

**Exhibit 9 – Certifications (n= 872)**

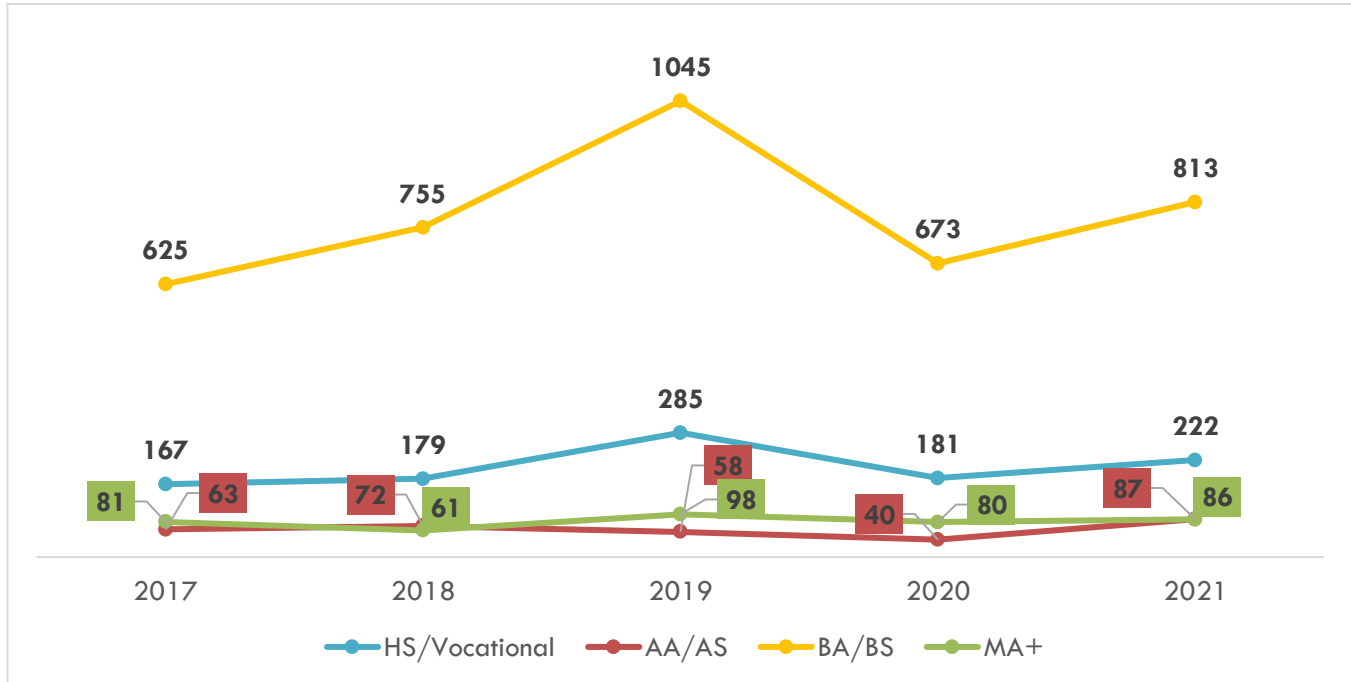
<b>Certifications</b>	<b>Job Postings, Full Year 2021</b>
Security Clearance	188
Driver's License	88
CompTIA Security+	82
Cisco Certified Network Associate (CCNA)	57
Cisco Certified Network Professional (CCNP)	39

Source: Labor Insight/Jobs (Burning Glass)

### Job Postings - Minimum Educational Attainment – Change Over Time

Exhibit 10 displays the change in job advertisements for Computer Infrastructure and Support over the last five years, according to the minimum advertised education. In 2021, there were 1,208 total job ads posted with a minimum advertised education, with 222 of them requiring a high school diploma or vocational degree and the majority, 813, suggesting a minimum educational attainment of BA/BS for this occupational grouping.

**Exhibit 10 – Educational Demand, Minimum Advertised**



Source: Labor Insight / Jobs (Burning Glass)

### Job Postings – Proportion of Job Postings by Minimum Educational Attainment Required

To gauge employer preference for candidates with particular education levels, the proportion of job postings by minimum advertised education appears in Exhibit 11. Employers posting job ads for the selected occupations for Computer Infrastructure and Support have most frequently sought candidates with a bachelor’s degree.

**Exhibit 11 – Occupational demand by education, minimum advertised**

Minimum Education Requirement	2017	2018	2019	2020	2021
HS Diploma / Vocational Training	18%	17%	19%	19%	18%
Associate Degree	7%	7%	4%	4%	7%
Bachelor’s Degree	67%	71%	70%	69%	67%
Graduate Degree	9%	6%	7%	8%	7%

Source: Labor Insight/Jobs (Burning Glass)

## Education and Training

Exhibit 12 shows the typical entry-level education requirement for the occupations of interest, along with the typical on-the-job training needed to attain competency in the occupation.

**Exhibit 12 – Education and Training Requirements**

<b>SOC</b>	<b>Occupation</b>	<b>Typical entry-level education</b>	<b>Typical on-the-job training</b>
15-1211	<b>Computer Systems Analysts</b>	Bachelor's degree	None
15-1221	<b>Computer and Information Research Scientists</b>	Master's degree	None
15-1231	<b>Computer Network Support Specialists</b>	Associate's degree	None
15-1241	<b>Computer Network Architects</b>	Bachelor's degree	None
15-1242	<b>Database Administrators</b>	Bachelor's degree	None

Source: Bureau of Labor Statistics Employment Projections (Educational Attainment)

### Regional Completions and Openings

There were 1,203 regional completions (2020) and 467 regional openings (2020) in the South Central Coast region in programs related to the occupations identified as aligned with Computer Infrastructure and Support.

#### Exhibit 13 – Completions and openings

<b>26</b> Regional Institutions had Related Programs (2020)	<b>1,203</b> Regional Completions (2020)	<b>467</b> Annual Openings (2020)
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Source: Economic Modeling Specialists International (EMSI)

### Related Programs

CIP Code	Program	Completions (2020)
11.0701	Computer Science	619
14.0901	Computer Engineering, General	152
11.0901	Computer Systems Networking and Telecommunications	129
11.0103	Information Technology	78
51.0707	Health Information/Medical Records Technology/Technician	74
11.1003	Computer and Information Systems Security/Auditing/Information Assurance	43
11.0101	Computer and Information Sciences, General	29
11.1006	Computer Support Specialist	25
11.0201	Computer Programming/Programmer, General	24
11.0899	Computer Software and Media Applications, Other	12
11.1001	Network and System Administration/Administrator	7
11.0804	Modeling, Virtual Environments and Simulation	6
11.0401	Information Science/Studies	5
52.1201	Management Information Systems, General	0

Source: Economic Modeling Specialists International (EMSI)

## CCC and Non-CCC Awards

Exhibit 14 lists the number of completers from programs related to Computer Infrastructure and Support in the South Central Coast Region.

**Exhibit 14 – CCC and Non-CCC awards, 2020**

<b>CCC Programs</b>	<b>Completers</b>
Santa Barbara City College	121
College of the Canyons	66
Antelope Valley College	53
Moorpark College	51
Oxnard College	45
Allan Hancock College	29
Cuesta College	26
<b>Non-CCC Programs</b>	<b>Completers</b>
Cal Poly San Luis Obispo	309
UC Santa Barbara	254
CSU Channel Islands	89
California Lutheran University	84
Laurus College	22
California Institute of the Arts	18
Westmont College	18
The Master's University and Seminary	11
Ventura Adult and Continuing Education	7

Source: Economic Modeling Specialists International (EMSI)

## Student Outcomes

The CTE LaunchBoard provides student outcome data on the effectiveness of CTE programs. The following student outcome information was collected from exiters of regional Computer Infrastructure and Support Programs (TOP: 0708.00) for the 2018-19 academic year.

- Completers of Computer Infrastructure and Support programs from the 2018-2019 academic year in the South Central Coast region had a **median annual wage upon completion of \$41,676.**
- 54% of students are **employed within a year** after completing a program.
- 55% of students **attained a living wage** within a year of completion.
- Completers experienced an average of **+22%** change in earnings after exiting.
- 70% of students were **part-time**, 10% **skill builders**, 34% **first-generation**, and 73% **economically disadvantaged.**



**Sources**

O\*Net Online, Labor Insight/Jobs (Burning Glass), Economic Modeling Specialists International (EMSI), MIT Living Wage Calculator, Bureau of Labor Statistics (BLS) Education Attainment, California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart, CTE LaunchBoard, Statewide CTE Outcomes Survey, Employment Development Department Unemployment Insurance Dataset

**Notes**

Data included in this analysis represent the labor market demand for relevant positions most closely related to Computer Infrastructure and Support. Traditional labor market information was used to show current and projected employment based on data trends, as well as annual average awards granted by regional community colleges. Real-time labor market information captures job post advertisements for occupations relevant to the field of study and can signal demand and show what employers are looking for in potential employees, but is not a perfect measure of the quantity of open positions. All representations have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. The most recent data available at the time of the analysis was examined; 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 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.