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# Labor Market Analysis

## Computer Information Systems & Advanced Information Systems



Prepared by Central Valley/Mother Lode Center of Excellence



POWERED BY



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# Summary

The Central Valley/Mother Lode Center of Excellence developed this report for Porterville College to determine whether there is demand in the local labor market that is not being met by the supply from postsecondary programs. This report summarizes labor market demand, wages, skills, and postsecondary supply for *Computer Information Systems and Advanced Information Systems*, which includes:

- Computer and Information Systems Managers (SOC 11-3021)
- Computer Systems Analysts (SOC 15-1211)
- Information Security Analysts (SOC 15-1212)

## Key Findings

- **Occupational Demand** — Occupations related to *Computer Information Systems and Advanced Information Systems* have a labor market demand of 296 annual job openings in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. Between 2021 and 2026, computer and information systems managers are projected to have the most demand with 145 annual job openings and jobs are projected to grow by 12%.
- **Wages** — Average entry-level earnings of \$43.34/hour for *Computer Information Systems and Advanced Information Systems* occupations are higher than the living wage in the SCV/SML subregion, which is \$11.91/hour for a single adult.<sup>1</sup> *Computer and information systems managers* earn the highest entry-level wage, \$53.79/hour.
- **Employers and Occupational Titles** — Employers in the SCV/SML subregion include Deloitte, CTG, and Northrop Grumman. The most common job title is systems analysts.
- **Skills and Certifications** — The top baseline skill is computer science, the top specialized skill is communication, and the top software skill is Microsoft Excel. The most in-demand certification is a certified information systems security professional.
- **Education** — A bachelor's degree is typically required for the occupations studied in this report.
- **Supply and Demand Analysis** — An analysis of supply and demand reveals that there are 296 annual openings (i.e., demand) and 172 average annual postsecondary degrees awarded (i.e., supply) in the SCV/SML subregion. This suggests an undersupply of 124 workers. In the CVML region, there are 454 annual openings and 193 awards were conferred suggesting an undersupply of 261 workers.

## Recommendation

Based on a comparison of demand and supply, there is an undersupply of trained workers in the SCV/SML subregion and the CVML region. The Center of Excellence recommends that Porterville College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of *Computer Information Systems and Advanced Information Systems* workers.

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<sup>1</sup> The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

# Introduction

The Central Valley/Mother Lode Center of Excellence developed this report to provide Porterville College with labor market information for *Computer Information Systems and Advanced Information Systems*. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use. Analysis of the program and occupational data related to *Computer Information Systems and Advanced Information Systems* is included in the report. The Standard Occupational Classification (SOC) System codes and occupational titles used in this report from the Bureau of Labor Statistics and O\*NET OnLine are shown below.

## Computer and Information Systems Managers (SOC 11-3021)

- **Job Description:** Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.
- **Knowledge:** Computers and Electronics, Customer and Personal Service, Administration and Management, Engineering and Technology, English Language
- **Skills:** Critical Thinking, Active Listening, Reading Comprehension, Judgment and Decision Making, Monitoring

## Computer Systems Analysts (SOC 15-1211)

- **Job Description:** 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.
- **Knowledge:** Computers and Electronics, Customer and Personal Service, English Language, Mathematics, Administration and Management
- **Skills:** Speaking, Reading Comprehension, Active Listening, Critical Thinking, Systems Analysis

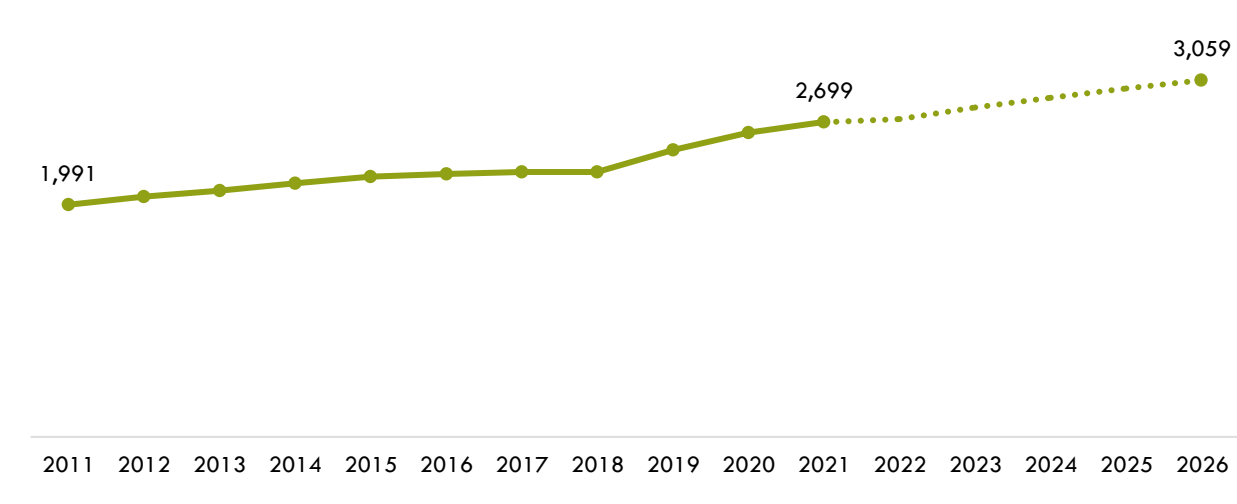
## Information Security Analysts (SOC 15-1212)

- **Job Description:** Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.
- **Knowledge:** Computers and Electronics, English Language, Administration and Management, Engineering and Technology, Telecommunications
- **Skills:** Reading Comprehension, Critical Thinking, Active Listening, Complex Problem Solving, Speaking

# Employment

Exhibit 1a shows trends for *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion. Between 2021 to 2026, the number of jobs for occupations related to *Computer Information Systems and Advanced Information Systems* is projected to increase by 360, growing by 13%.

**Exhibit 1a. Historical employment and projected occupational demand for occupations related to *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion, 2011-2026**



Occupations related to *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion employed 2,699 workers in 2021 (Exhibit 1b). Computer and information systems managers are projected to have the most annual job openings, with 145 annual openings.

**Exhibit 1b. Current employment and projected occupational demand for occupations related to *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion, 2021-2026**

Occupation	2021 Jobs	2026 Jobs	5-Year Change	5-Year % Change	Annual Openings
Computer and Information Systems Managers	1,272	1,428	157	12%	145
Computer Systems Analysts	1,196	1,333	137	11%	118
Information Security Analysts	231	298	67	29%	33
<b>TOTAL</b>	<b>2,699</b>	<b>3,059</b>	<b>360</b>	<b>13%</b>	<b>296</b>

# Wages

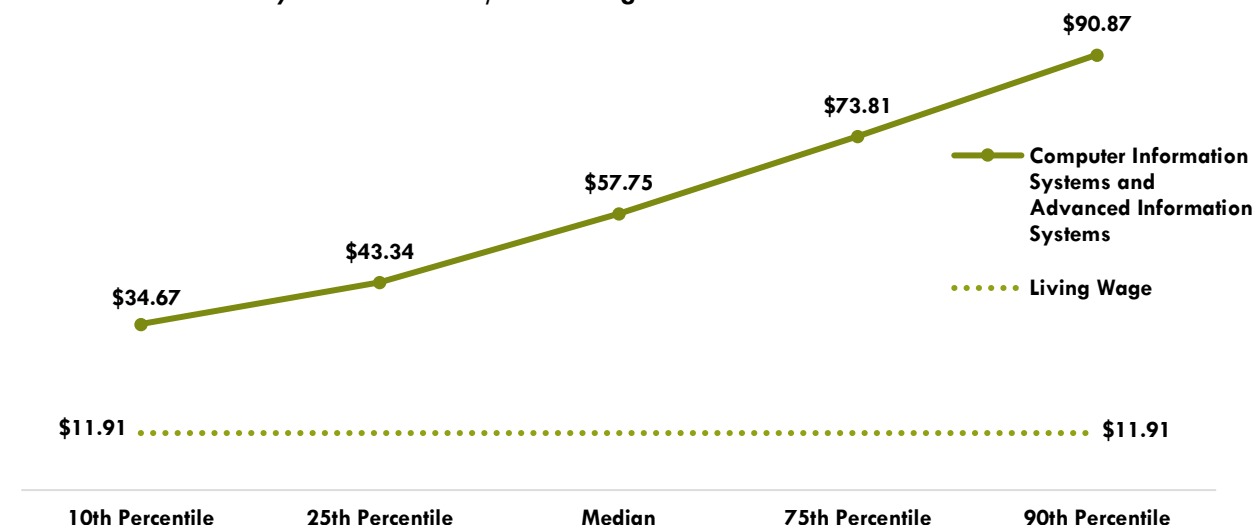
The average living wage for a single adult in the SCV/SML subregion is \$11.91/hour.<sup>2</sup> Exhibit 2a shows the highest entry-level hourly wages for computer and information systems managers, which has an entry-level wage of \$53.79/hour.<sup>3</sup>

**Exhibit 2a. Hourly wages for occupations related to Computer Information Systems and Advanced Information Systems in the SCV/SML subregion**

Occupation	25 <sup>th</sup> Percentile Hourly Earnings	Median Hourly Earnings	75 <sup>th</sup> Percentile Hourly Earnings
Computer and Information Systems Managers	\$53.79	\$70.04	\$89.76
Information Security Analysts	\$41.57	\$58.97	\$75.10
Computer Systems Analysts	\$34.65	\$44.25	\$56.56

Exhibit 2b shows the average hourly wages for Computer Information Systems and Advanced Information Systems occupations; the average entry-level wage is more than the living wage for the SCV/SML subregion.

**Exhibit 2b. Average hourly wages for occupations related to Computer Information Systems and Advanced Information Systems in the SCV/SML subregion**



<sup>2</sup> The term “living wage” in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center’s California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

<sup>3</sup> Note: 10<sup>th</sup> and 25<sup>th</sup> percentiles are considered entry-level wages while 75<sup>th</sup> and 90<sup>th</sup> are considered experienced wages, which may be obtained through long-term employment or extra training, etc.

# Job Postings

There were 440 unique job postings for occupations related to *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion from April 2023 to September 2023.<sup>4</sup>

## Top Employers

The top employers with the most job postings are listed in Exhibit 3. The top employers in online job postings were Deloitte, CTG, and Northrop Grumman.

### Exhibit 3. Top employers of *Computer Information Systems and Advanced Information Systems* in job postings

Employer
Deloitte
CTG
Northrop Grumman
California State University
DCS Corporation
Kern Community College District
Navair International Ltd
Raytheon Technologies
Booz Allen Hamilton
Vicon Industries

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<sup>4</sup> Other than occupational titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

## Top Job Titles

Exhibit 4 shows the most common job titles for *Computer Information Systems and Advanced Information Systems* in the SCV/SML subregion.

### Exhibit 4. Top job titles in job postings for *Computer Information Systems and Advanced Information Systems*

Job Title
Systems Analysts
Configuration Analysts
Information Systems Security Officers
Security Engineers
Business Systems Analysts
Directors of Information Technology
IT Information Security Specialists
Cybersecurity Analysts
Computer Information Systems Instructors
Security Analysts

## Salaries

Exhibit 5 shows the “Market Salaries” for *Computer Information Systems and Advanced Information Systems*. These are calculated by Lightcast using a machine learning model built from millions of job postings every year. This accounts for adjustments based on location, industry, skills, experience, education, among other variables.

### Exhibit 5. Market salaries for *Computer Information Systems and Advanced Information Systems*

Market Salary	Job Postings
\$75,000-\$84,999	21
\$85,000-\$94,999	25
\$95,000-\$104,999	20
\$105,000-\$114,999	15
\$115,000-\$124,999	20

## Education

Of the 440 unique job postings, 313 listed a preferred or minimum educational requirement for the position being filled. Among those, 12% requested a high school diploma or GED, 6% requested a bachelor's degree, and 51% requested an associate degree (Exhibit 6).

**Exhibit 6. Education levels requested in job postings for Computer Information Systems and Advanced Information Systems**

Education Level	Job Postings	% of Job Postings
High school or GED	51	12%
Associate degree	223	51%
Bachelor's degree	26	6%
Master's degree	11	3%
Ph.D. or professional degree	2	0%

## Baseline, Specialized, and Software Skills

Exhibit 7 depicts the top baseline, specialized, and software skills in job postings. The most requested baseline skill is computer science. The most requested specialized skill is communication. The most requested software skill is Microsoft Excel.

**Exhibit 7. In-demand baseline, specialized, and software skills for Computer Information Systems and Advanced Information Systems in job postings**

Baseline Skills	Specialized Skills	Software Skills
Computer Science	Communications	Microsoft Excel
Cyber Security	Management	Microsoft PowerPoint
Project Management	Operations	SQL (Programming Language)
Information Systems	Leadership	Operating Systems
Auditing	Information Technology	Amazon Web Services

## Certifications

Of the 440 job postings, there were 339 certifications listed. Among those, 9% indicated a need for a certified information systems security professional, as well as secret clearance and CompTIA Security+ (Exhibit 8).

**Exhibit 8. Top Computer Information Systems and Advanced Information Systems certifications requested in job postings**

Certifications	% of Job Postings
Certified Information Systems Security Professional	9%
Secret Clearance	9%
CompTIA Security+	9%
Security Clearance	8%
Top Secret Clearance	6%

# Education, Work Experience, & Training

A bachelor's degree is typically required for the three occupations studied in this report (Exhibit 9).

**Exhibit 9. Education, work experience, training, and Current Population Survey results for occupations related to Computer Information Systems and Advanced Information Systems<sup>5</sup>**

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Computer and Information Systems Managers	Bachelor's degree	5 years or more	None	21.1%
Computer Systems Analysts	Bachelor's degree	None	None	20.2%
Information Security Analysts	Bachelor's degree	Less than 5 years	None	26.5%

## Supply

An analysis of program data from the Integrated Postsecondary Education Data System (IPEDS) for the last three program years shows that, on average, 172 awards were conferred in the SCV/SML subregion (Exhibits 10 and 11).

**Exhibit 10. TOP and CIP codes for Computer Information Systems (0702.00)**

TOP Titles	CIP Titles
0702.00 - Computer Information Systems	11.0101 Computer and Information Sciences, General
	11.0103 Information Technology
	11.0501 Computer Systems Analysis/Analyst
	30.7001 Data Science, General

<sup>5</sup> "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.

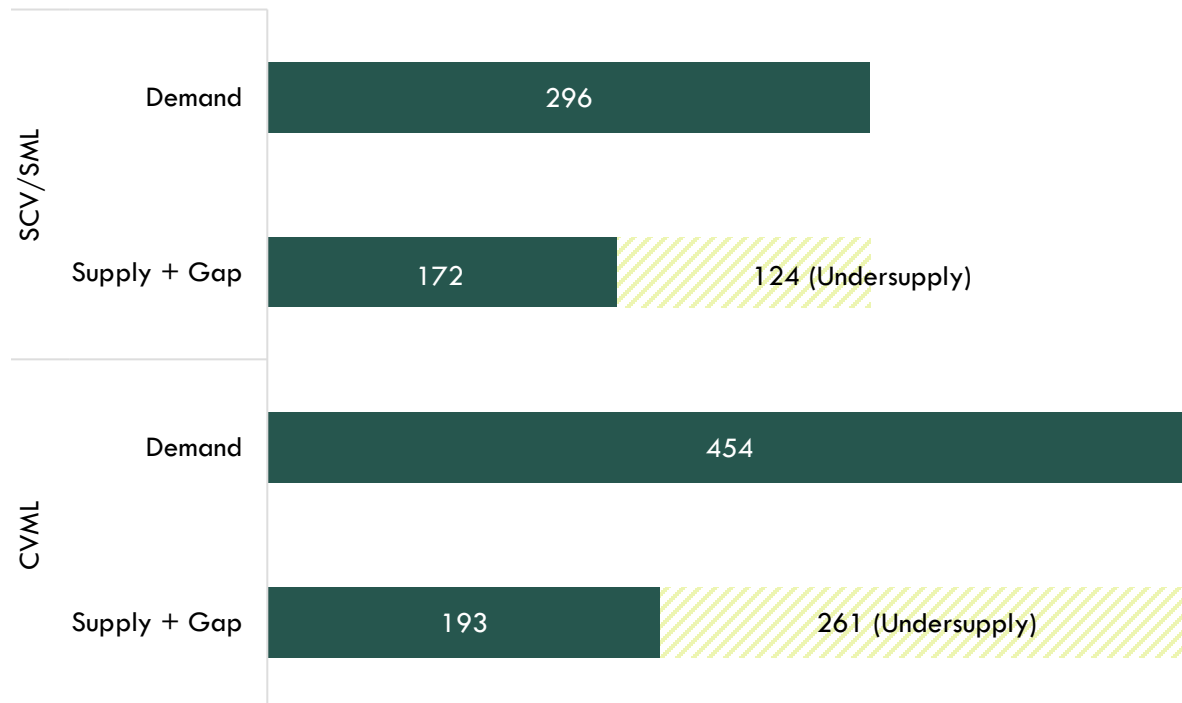
**Exhibit 11. Postsecondary supply for Computer Information Systems and Advanced Information Systems for Program Years 2019-20 through 2021-22**

TOP/CIP Code- Title	College	Associate Degree	Noncredit Award < 48 Hours	Certificate 30 < 60 Semester Units	Certificate 16 < 30 Semester Units	Certificate 8 < 16 Semester Units	Total
0702.00 - Computer Information Systems	Bakersfield	0					0
	Cerro Coso	23		19	23		65*
	Clovis College				1		1*
	Fresno City	10			12		22*
	Merced	3		2			5
	Porterville	6					6*
	Reedley College				18	0	18*
	San Joaquin Delta	16					16
	Sequoias	6		2			8*
11.0101 - Computer and Information Sciences, General	Milan Institute-Visalia				9		9*
11.0103 - Information Technology	San Joaquin Valley College-Visalia	16		22	5		43*
<b>SCV/SML TOTAL</b>		<b>61</b>	<b>0</b>	<b>43</b>	<b>68</b>	<b>0</b>	<b>172</b>
<b>CVML TOTAL</b>		<b>80</b>	<b>0</b>	<b>45</b>	<b>68</b>	<b>0</b>	<b>193</b>

\*SCV/SML awards

There is an undersupply of 124 Computer Information Systems and Advanced Information Systems workers in the SCV/SML subregion and an undersupply of 261 workers in the region (Exhibit 12).

**Exhibit 12. Information Systems workforce demand (annual job openings), postsecondary awards (supply), and additional students needed to fill gap in the SCV/SML subregion and region**



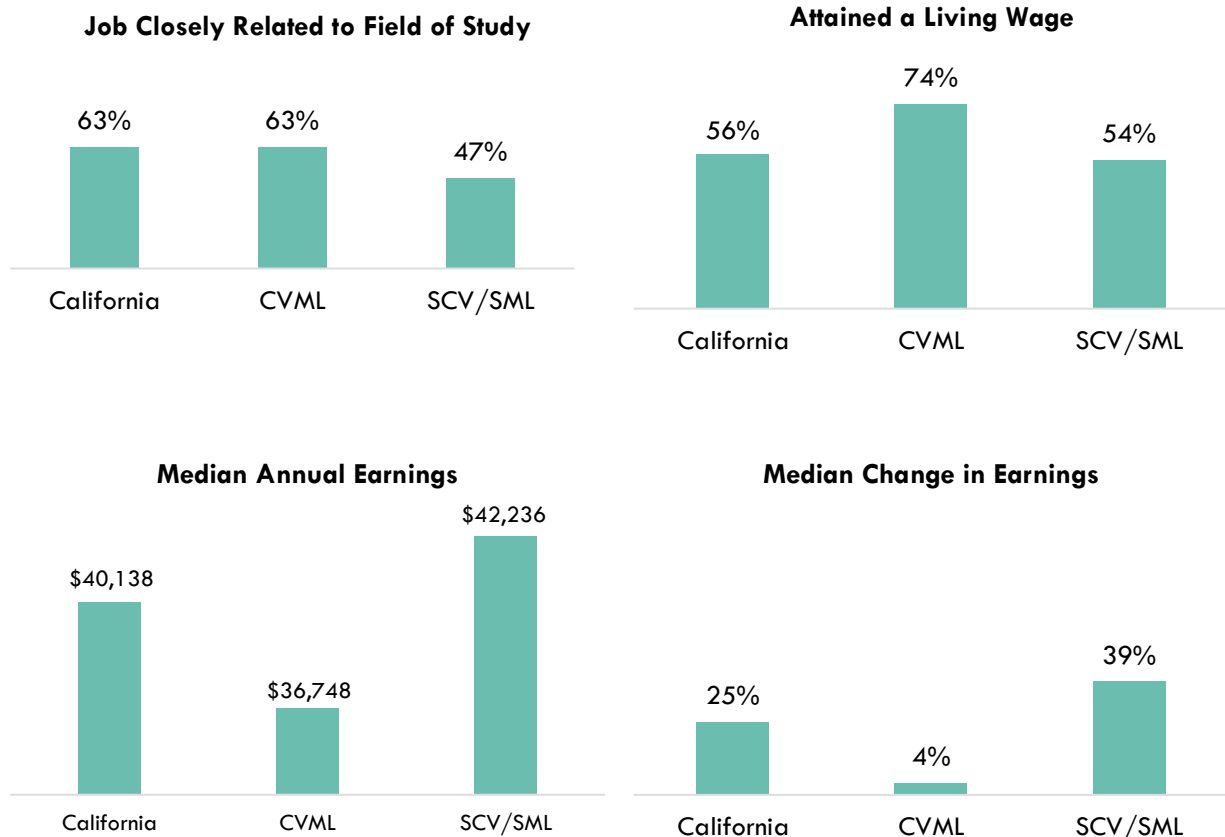
# Student Outcomes

Exhibits 13a-13b summarize outcomes from California Community College Chancellor’s LaunchBoard for TOP codes related to *Computer Information Systems and Advanced Information Systems*. Notably, 47% of students obtained a job closely related to their field of study and 54% of students attained a living wage in the subregion.

**Exhibit 13a. LaunchBoard Metrics for TOP 0702.00 - Computer Information Systems in the subregion**

Metric	
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	26

**Exhibit 13b. LaunchBoard Metrics for TOP 0702.00 - Computer Information Systems in California, CVML region, and SCV/SML subregion**



# Recommendation

This report suggests there is a shortage of 124 workers in the SCV/SML subregion and a shortage of 261 workers in the CVML region for *Computer Information Systems and Advanced Information Systems*. Based on these findings, it is recommended that Porterville College work with the regional directors, the college's advisory board, and local industry in the expansion of programs to address the shortage of *Computer Information Systems and Advanced Information Systems* workers in the region.

# Appendix: Methodology & Data Sources

## Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor’s Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (Lightcast). Lightcast occupational employment data are based on final Lightcast industry data and final Lightcast staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Lightcast earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: <a href="https://www.bls.gov/emp/tables/educational-attainment.htm">https://www.bls.gov/emp/tables/educational-attainment.htm</a> .
LaunchBoard	Chancellor’s LaunchBoard. <a href="https://www.calpassplus.org/LaunchBoard/SWP.aspx">https://www.calpassplus.org/LaunchBoard/SWP.aspx</a>
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a> .
Job Posting and Skills Data	Lightcast: <a href="https://lightcast.io/">https://lightcast.io/</a> .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: <a href="http://onetonline.org">onetonline.org</a> .

## Key Terms and Concepts

**Annual Job Openings:** Annual openings are calculated by dividing the number of years in the projection period by total job openings.

**Education Attainment Level:** The highest education attainment level of workers age 25 years or older.

**Employment Estimate:** The total number of workers currently employed.

**Employment Projections:** Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (LIGHTCAST) formula that includes historical employment and economic indicators along with national, state and local trends.

**LaunchBoard (Attained the Living Wage):** Among SWP students who exited college and did not transfer to any postsecondary institution, the proportion who attained the district county living wage for a single adult measured immediately following academic year of exit

**LaunchBoard (Median Annual Earnings):** Among SWP students who exited the community college system and who did not transfer to any postsecondary institution, median earnings following the academic year of exit.

**LaunchBoard (Median Change in Earnings):** Among SWP students who exited and who did not transfer to any postsecondary institution, median change in earnings between the second quarter prior to the beginning of the academic year of entry and the second quarter after the end of the academic year of exit from the last college attended.

**LaunchBoard (Job Closely Related to Field of Study):** Among SWP students who responded to the CTE Outcomes Survey and did not transfer to any postsecondary institution, the proportion who reported that they are working in a job very closely or closely related to their field of study.

**Living Wage:** The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

**Occupation:** An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

**Percent Change:** Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

**Replacements:** Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

**Total Job Openings (New + Replacements):** Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

**Typical Education Requirement:** represents the typical education level most workers need to enter an occupation.

**Typical On-The-Job Training:** indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.